MEDICAID ADMINISTRATIVE COSTS: TRENDS, EXPANSION EFFECTS, AND EXPRESS LANE ELIGIBILITY

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DEDICATION

I dedicate this work to my loving and supportive husband, Robert Luke. For both of us, these past four years have been full studying, writing, and many highs and lows. You have provided unwavering support through both the tears and celebrations, and for that I am incredibly grateful. I love you and I could not have done this without you.

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Casey Patricia Balio

MEDICAID ADMINISTRATIVE COSTS: TRENDS, EXPANSION EFFECTS, AND EXPRESS LANE ELIGIBILITY

Medicaid covers 21% of Americans which includes over 65 million children and adults, making it the largest single source of health insurance for Americans. As a public program jointly administered between the federal and state governments, states exhibit substantial control over the structure of their programs, with the intention of modifying programs to fit the needs of the state and population. Medicaid has experienced numerous changes at both the state and federal levels in recent years which have created novel ways of modifying their structures, many of which may have implications for administrative expenditures. As publicly funded programs and given the state autonomy over such, it is important to consider the relationships and effects of such decisions on the performance of these programs.

The purpose of this dissertation is to consider numerous variations in state Medicaid programs and the state contexts in which they operate, and the relationship to administrative spending. This dissertation focuses on three studies including 1) a panel analysis of the trends and correlates of state Medicaid administrative expenditures, 2) a quasi-experimental study of the effects of Medicaid expansion on administrative expenditures, and finally 3) a quasi-experimental study of the effects of the use of Express Lane Eligibility on administrative expenditures. Overall, this dissertation provides a better understanding of the variations, correlates, and drivers of Medicaid administrative expenditures.

Nir Menachemi, PhD, Chair

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CHAPTER ONE

INTRODUCTION

Introduction

Medicaid was established with the passage of the Social Security Act in 1965 to provide health insurance to low income children, parents, and individuals with disabilities.[1.1–1.4] It was included as a late addition to the overall Act which focused on Medicare and Social Security.[1.1, 1.3] In the years after 1965, it became clear that Medicaid was an important component of the US healthcare system as it quickly exceeded it's expected coverage and costs.[1.2–1.4] Since then, Medicaid and its more recent partner program, the Children's Health Insurance Program (CHIP), have grown to cover over 72 million individuals in the US in 2019,[1.5] including 39% of children in the United States in 2017.[1.6]

Medicaid was designed to be jointly administered by states and the federal government in terms of both design and funding.[1.1, 1.3] While there are federal standards that the programs must meet and changes must be approved by the Centers for Medicare and Medicaid Services (CMS, the federal administrator of the program), states design many of the components of their programs. Funding is similar in that there is a 'match' between the costs the states incur and what the federal government will contribute called the Federal Medical Assistance Program (FMAP).[1.7, 1.8] For medical expenditures, this is based on the average income of the state. For administrative expenditures, it varies by particular expenditure but is consistent across states. CHIP programs utilize a different 'enhanced-FMAP.' This joint structure was created to allow states to modify their programs to fit the needs of their states and constituents. The autonomy provided to states has cultivated great variation in Medicaid programs across states, including in terms of eligibility criteria, enrollment processes, services covered, and the use of managed care,[1] many of which have possible implications for administrative costs.

Modifications to Medicaid programs may arise from individual state circumstances or stem from federal policy changes.[1.9] In recent years, Medicaid has seen numerous state and

federal policy changes including the introduction of Express Lane Eligibility (ELE) through the Children's Health Insurance Program Reauthorization Act (CHIPRA) in 2009, the Affordable Care Act (ACA) in 2010, and renewed interest from the federal government for the use of 1115 demonstration waivers to experiment with new program components. ELE is an optional program component where other state safety net programs such as the Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF), and the National School Lunch Program (NSLP) are able to identify children that are potentially eligible for Medicaid or CHIP in order to increase enrollment and create administrative efficiencies. [1.10, 1.11] The ACA originally included mandatory Medicaid expansion for all states where those who opted out would lose federal funding, an unattractive option to states given the costs of Medicaid and the federal match rates in place. [1.12] However, after states contested this component of the ACA, the Supreme Court ruled that mandatory expansion was unconstitutional and became optional for states. Since then, 37 states including DC have expanded their Medicaid programs. [1.13] 1115 Demonstration waivers were included in the original 1965 legislation establishing Medicaid as a way for states to experiment with their programs. [1.9, 1.14] This supported the idea of state learning and policy experimentation. While these changes must be approved by CMS, demonstration waivers have been used for a variety of modifications including covering additional services, requiring cost sharing, and community engagement requirements often referred to as work requirements. [1.9, 1.14] In addition to approval by CMS, waivers must go through a public comment period and have a formal, independent evaluation. [1.14]

In addition to the numerous policy changes, as publicly funded programs in which eligibility is based on income, Medicaid and CHIP are particularly sensitive to economic changes, such as the Great Recession of 2008. [1.15–1.17] These policy and economic changes have fostered numerous Medicaid changes which not only affect enrollment, but likely affect overall and administrative costs of the programs.

Historically, Medicaid has exhibited considerable variation in total per capita spending both within and across states, and greater variation across the country than in Medicare or overall per capita spending. [1.18] Many studies have identified state, political, economic, and program characteristics associated with spending, but either focus on overall spending or medical spending and do not consider administrative spending. [1.19–1.22] One of these studies identified that much of the variation in spending is due to discretionary spending, [1.22] which may suggest that at least some portion of administrative costs too are within the control of the state. When considering administrative costs specifically, Medicaid often ranks between those of Medicare and private insurers. [1.23–1.26] The autonomy of state programs and the variation that exists in overall per capita spending in Medicaid suggests that there may also be variation in administrative costs across states and time.

Overview of Dissertation

The purpose of this dissertation is to estimate state Medicaid administrative costs with respect to state, political, and specific programmatic characteristics. Study 1 will use data from 2007-2017 to describe state Medicaid administrative expenditures, trends, and identify contemporaneous state, political, and programmatic correlates of state administrative expenditures. Study 2 will estimate the effects of ACA Medicaid expansion on administrative expenditures as well as the mediating effects of enrollment gains. Study 3 will estimate the effects of ELE on enrollment and administrative costs.

Study 1 will consider the association between Medicaid administrative costs and state demographic, economic, and programmatic characteristics. Medicaid programs exhibit substantial variation in costs across the country. [1.18] Previous research has focused on what factors are associated with medical or overall Medicaid spending. [1.19–1.22] Factors associated with medical and overall spending include eligibility criteria, services covered, and prices. The variation in Medicaid spending and program structure suggest there may be associated differences in administrative spending as well. This study will build on this previous work by utilizing state-

year demographic, economic, and program characteristics to describe trends in and correlates of state administrative costs between 2007-2017.

Study 2 will use a quasi-experimental, generalized difference-in-differences (DID) approach to compare changes in administrative expenditures in states that expanded Medicaid after the ACA compared to those who did not. Studies of the most recent Medicaid expansion through the ACA have considered countless effects from those directly intended [1.27, 1.28] such as enrollment and access to care to those more distant from the policy change such as receipt of payday loans [1.29] and housing evictions. [1.30] While there have been studies that have considered the financial implications of expansion, [1.27, 1.28, 1.31] these are less common and have not considered administrative costs specifically. Among the collection of expansion studies, many focused on the coarse approach of comparing expansion states to non-expansion states by treating all expansion states the same. However, several studies have not only estimated effects of expansion compared to non-expansion states, but have considered variation among expansions. [1.32–1.34] These studies have identified heterogeneous effects of expansion and make a case for considering variations in expansion rather than using expansion as a binary measure. As in previous studies, we will consider expansion decisions as well as the size of the expansions as the policy intervention. Additionally, we will consider the mediating effect of enrollment gains on the causal pathway between expansion and administrative expenditures.

Study 3 will also use a generalized DID design to estimate the effects of ELE on child enrollment and administrative costs. The introduction of federal support for ELE began with CHIPRA in 2009. This provided guidance on the numerous options that existed in designing an ELE program and participating states would qualify for a performance bonus, incentivizing the program. Like other Medicaid components, ELE allows for a variety of structures including choice of agencies to coordinate with, use of ELE for preliminary eligibility determinations and/or redeterminations, and the use of automatic enrollment or a simplified process. Early studies of ELE have focuses on the enrollment benefits which have been consistently seen, but

few consider administrative costs.[1.10, 1.11, 1.35–1.38] Those that do often rely on qualitative data, acknowledge data limitations, and find mixed results across agencies. Additionally, while many studies consider the variations in use of ELE for automatic enrollment and other ELE structural choices, no studies consider the coordinating agency. Finally, these studies often use data through 2011, however there have been additional states to implement ELE since then in different forms and several states have stopped ELE. Our study will improve upon previous work by extending the sample time period, consider states that had not yet implemented ELE in the early work, consider the coordinating agency/agencies, and will include objective measures of administrative costs as reported by Medicaid and CHIP.

Overall, this dissertation intends to consider the numerous variations in state Medicaid programs and their contexts and the relationship to administrative costs. In a time with unprecedented rates of change in Medicaid and continued dialogue about the efficacy and efficiency of various health insurance programs at the state and national levels, this dissertation will provide context and empirical evidence to support these conversations.

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CHAPTER TWO

TRENDS AND CORRELATES OF STATE MEDICAID ADMINISTRATIVE EXPENDITURES (2007 – 2017)

Introduction

Medicaid covers 21% of Americans [2.1] which includes 65 million children and adults, [2.2] making it the single largest source of health insurance in the United States. Medicaid is jointly funded by the states and the federal government and gives states substantial control over the structure and administration of their programs. This control facilitates policy learning and experimentation as states modify program structures, eligibility, and managed care participation in an effort to meet the needs of their constituents and program. Over time, health care costs have increased for all Americans; and recent reform efforts including those focused on Medicaid have sought to improve the value of care in part by reducing per capita costs.

There has been considerable variation in overall per capita Medicaid spending both within and across states, to an even greater extent than in private insurance or Medicare. [2.3] Medicaid spending is believed to be a function of state decisions and economic conditions. Differences in medical and overall Medicaid spending have been linked to enrollment changes, differences in covered services, prices, and other program structural choices, [2.4–2.8] many of which may also contribute to administrative costs. Historically Medicaid has maintained relatively low administrative costs at approximately 4-5% of total spending compared to those of Medicare (1-6%) and private insurance (8-13%). [2.9–2.13] But a recent report identified a higher percent administration in Medicaid at 10.4% and a greater growth rate in administrative spending compared to other insurance types. [2.13] Importantly, there is little consensus around the methods and measures for estimating and comparing administrative costs across different insurance types. [2.9, 2.10, 2.14, 2.15] For example, the recent report which estimated a much higher percent of Medicaid spending on administration included other costs outside of the direct administrative costs by the government agency. [2.13] Given the variation in overall and medical expenditures across states,

national estimates of administrative spending may be masking state differences. At a time with unprecedented changes in Medicaid with further reforms being considered, surprisingly little is known about administrative costs in Medicaid at the state level, how they have changed over time, and whether state, political, and Medicaid program characteristics are related to per enrollee and overall administrative costs.

The purpose of this study is to (1) summarize national and state per-enrollee Medicaid administrative spending trends and (2) to identify state, political, and program characteristics associated with these expenditures. This study uses state Medicaid expenditure reports from 2007-2017 in order to characterize state spending profiles over time. Findings from this study will be of interest to state and federal policymakers including those at the Centers for Medicare and Medicaid Services in understanding costs, efficiency, and the variation in programs, especially considering that spending in Medicaid, especially through eligibility choices, has always been highly politicized and associated with state politics and state philosophical ideologies. [2.6–2.8] Findings may inform future budget allocation, spending decisions, and other structural program decisions.

Conceptual Framework

Administrative spending in the US healthcare system has been of great interest as it is substantially higher than in other countries and a significant proportion of it may be considered waste. [2.12, 2.16, 2.17] Administrative spending by health insurers includes a variety of activities such as billing and eligibility assessments [2.18] and therefore is likely a function of enrollment. A variety of characteristics including economic, demographic, political, and program structure drive enrollment in Medicaid and therefore may be important contributors to administrative spending. Our study will consider these categories of state contextual factors as potential correlates of Medicaid administrative spending.

First, as a publicly funded and state-run program, Medicaid in particular may be subject to state economic conditions including recessions, [2.18–2.20] and states may be able to affect

enrollment through administrative processes required for enrollment. Second, Medicaid historically has catered to certain demographics (i.e. low income children and parents and individuals with disabilities) and certain populations are disproportionately insured by Medicaid, [2.21] thus consideration of state demographic characteristics may be related to administrative spending. Next, political factors may also be important as governors are often highly involved in making changes to Medicaid programs. Previous work on discretionary spending in Medicaid identified political characteristics as important correlates of such spending. [2.7] Finally, programmatic characteristics such as eligibility generosity, measured as the eligibility criteria for parents, are also set at the state level and have been associate with enrollment. [2.20] Other programmatic characteristics including managed care coverage and federal match rates may shield Medicaid programs from certain costs and therefore may be related to administrative spending specifically.

Methods

Using a longitudinal, panel analysis, this study considers the association between Medicaid administrative costs and contemporaneous state, program, and political characteristics.

Population & Data

This study utilizes 11 years of state-year level data for all 50 states, excluding Washington, DC from 2007-2017. The study relies on a novel dataset compiled from various public sources. Cost data are from CMS Form 64 in which states report their annual Medicaid expenditures. [2.22] Medicaid enrollment data are from Kaiser Family Foundation (KFF) reports [2.23, 2.24] and CMS's Medicaid Budget and Expenditure System Quarterly Medicaid Enrollment reports. [2.25] State demographic and economic data are from the American Community Survey (ACS), [2.26] Current Population Survey (CPS), [2.27] the US Census Bureau, [2.28] and CDC WONDER. [2.29] Political characteristics were obtained from the National Governors Association (NGA) [2.30] and National Association for State Budget Officers (NASBO). [2.31] Program characteristics were compiled from various KFF sources. [2.32–34]

Dependent Variables

All measures were obtained for the state-year level, unless otherwise noted. The dependent variables include two measures of state Medicaid annual administrative expenditures. Within CMS Form 64, spending reports include specific line items although for the purposes of this study, the CMS defined categories of "medical assistance program" and "administrative" will be used. Specific measures of expenditures include the percent of total expenditures that are administrative and per-enrollee administrative expenditures. All spending values are converted into 2017 dollars using the CPI calculator from the Bureau of Labor Statistics (BLS).

In order to calculate per-enrollee administrative expenditures, June enrollment values were obtained from Kaiser Family Foundation (KFF) reports for years 2007-2013. Starting in June 2014, enrollment values were obtained from CMS's Medicaid Budget and Expenditure System Quarterly Medicaid Enrollment reports. June enrollment were used because of availability across time and sources. After reviewing state-specific trends in enrollment across the transition between data sources, state enrollment appears to show a smooth transition across data sources.

Independent Variables

Independent variables include a variety of state, program, and political characteristics in addition to an indicator for pre, during, or post the Great Recession because of the known relationship between economic conditions and Medicaid enrollment. [2.19, 2.20, 2.35] Period 1 is considered pre-recession and includes 2017. Period 2 (2008-2009) reflects the recession, Period 3 (2010-2013) is the post-recession and pre-ACA implementation, and Period 4 (2014-2017) is the post-recession, post-ACA implementation. The post-recession period was divided into two by the main ACA implementation occurring in 2014 at which time there were numerous changes happening in Medicaid that created a different healthcare environment at both the state and national levels. These characteristics were selected because of their suspected or known relationship to Medicaid costs or enrollment or their common use as controls in Medicaid studies.

State characteristics included demographic and economic characteristics of the population and state for each year. These included the annual unemployment rate from BLS; population size in millions, percent of the population age 25 or older with at least a high school diploma or equivalent, percent of the population male, percent of the population age 65 and older, and percent or population white, black, all other races, and percent Hispanic from the American Community Survey. Birth rate measured as the number of live births per 1,000 population was obtained from CDC WONDER. Poverty rate measured as the percent below 100% FPL was obtained from the Current Population Survey. State region was defined using the US Census Bureau designations.

Political characteristics included the governor's political affiliation from the National Governor's Association rosters of current and past governors and the percent of the state budget spent on Medicaid from the National Association for State Budget Officers. Governor's political affiliation was measured using the political party of the governor in office as Democrat, Republican, or other for at least 10 months of the year. Due to sample size limitations, this was recategorized to republican or democrat/other as there are only 3 observations with an Independent governor, and all occur in the same state. Governor's political affiliation was used as many Medicaid decisions made at the state-level are informed by the governor.

While there are numerous program characteristics that could have been included, this study focuses primarily on those considered relevant to spending or enrollment. The percent of individuals enrolled in managed care was obtained from reports from KFF covering years 2007-2017, except for 2012. Percent managed care for 2012 was imputed by averaging the 2011 and 2013 values based on the assumption that changes in managed care are relatively smooth and incremental. The Federal Medical Assistance Percentage (FMAP) is the federal match rate for the medical costs of Medicaid which was obtained from a KFF report. This figure is calculated annually based on the average per-capita income for a state where those with lower per-capita incomes receive higher match rates. The FMAP rate must be at least 50% for each state. The

eligibility criteria for parents in Medicaid as a percent FPL was included as a measure of program generosity. This measure of eligibility was used as parents have historically been eligible for Medicaid across states for the full study period at least to some extent. These values were also obtained from KFF reports.

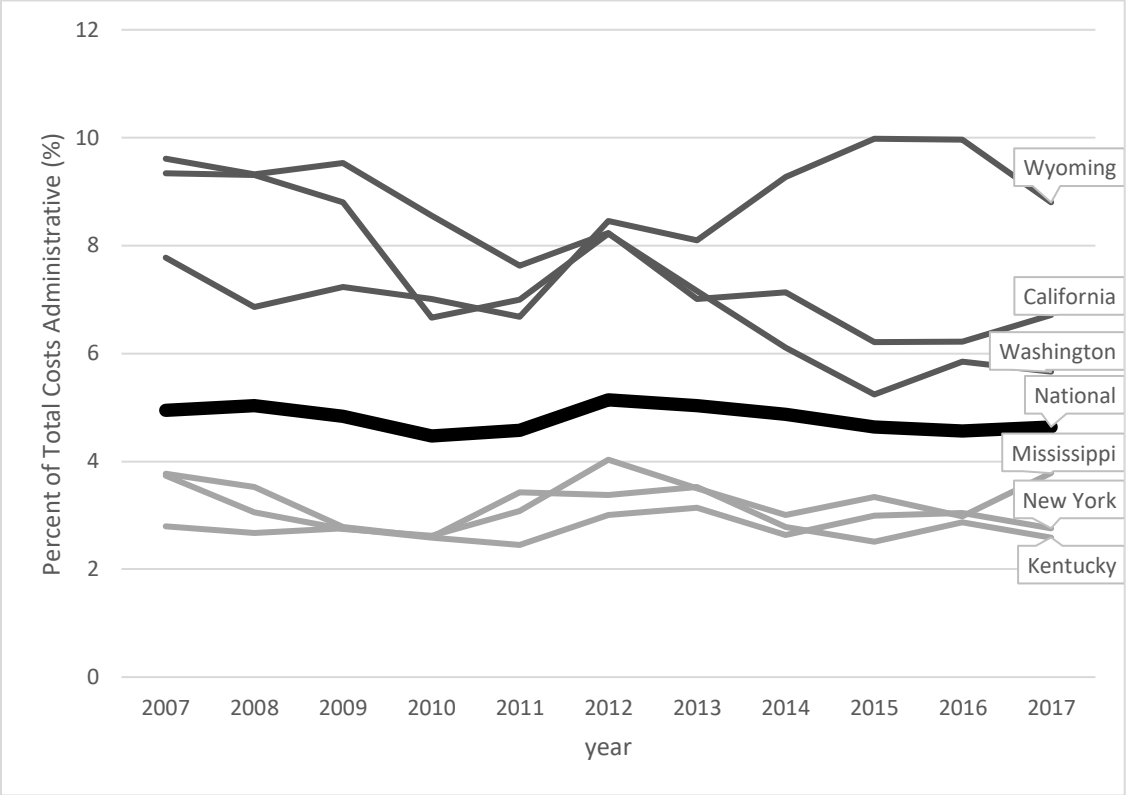
Analyses

Descriptive statistics were conducted to describe state spending levels and trends between 2007-2017. States with average highest and lowest spending levels over time were identified. The top and bottom 1 percentile of state-year observations in terms of their administrative spending were excluded from analyses as they contain improbable values. Panel regression methods were used to model various administrative spending measures as a function of the state, political, and programmatic characteristics described earlier. State fixed-effects models were ultimately selected based on formal tests, previous literature, and the nature of the data. Several sensitivity analyses were also included to assess the robustness of the findings to various analytic decisions. These included differing exclusion criteria for implausible administrative spending values including removing only the bottom 1 percentile, removing Vermont's observations for 2007-2011 based on other Medicaid changes happening in the state during this time, and including all state-year observations. Separate sensitivity analyses included lagged versions of the political indicators as it may take time for changes in policy under new administration to be passed or implemented.

Results

Throughout the 2007-2017 period, the national average for administrative expenditures as a percent of total Medicaid spending stayed relatively stable between 4.5-5.1%, however states ranged from a minimum of 1.7% (Arizona, 2011) to 9.6 (California, 2007, Figure 1). In 2017 alone, the percent of Medicaid expenditures that were administrative ranged from 2.29% (Arizona) to 8.8% (Wyoming, Figure 1).

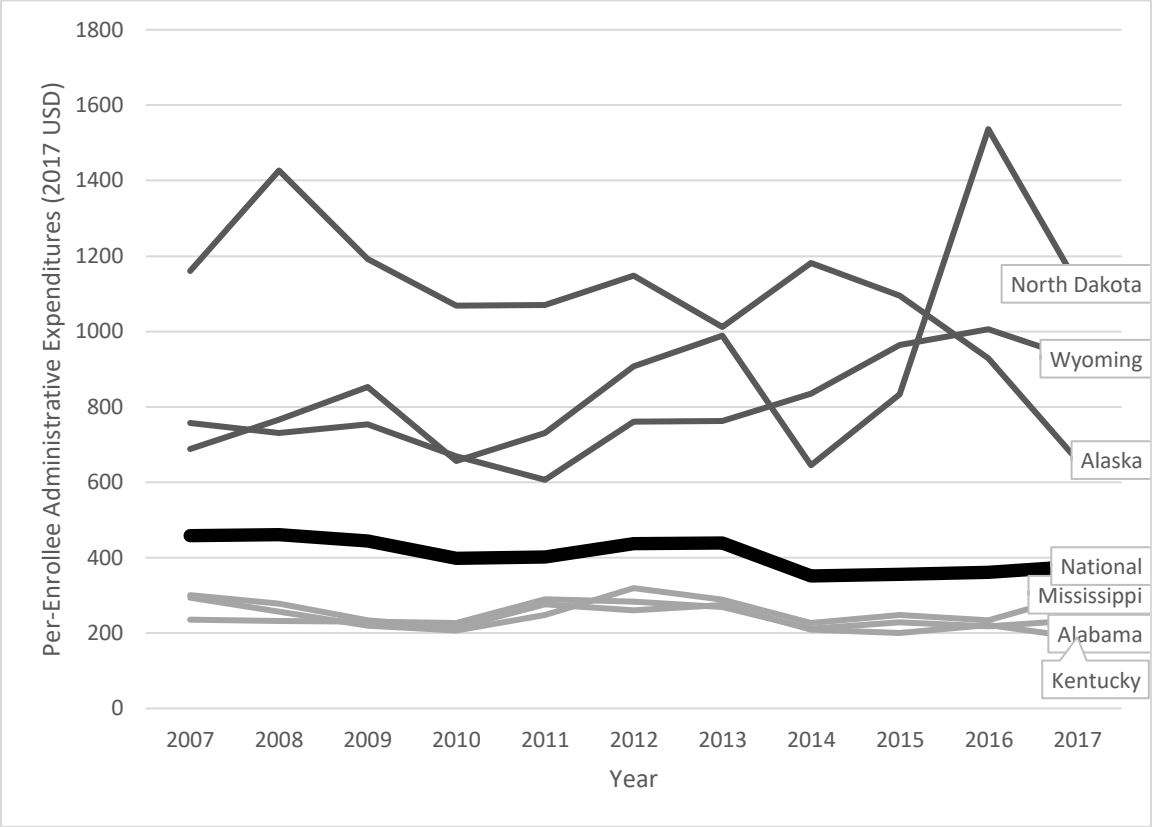
Figure 1. Trends in Spending as a Percent of Total Spending



NOTE: State-level trends in the percent of total spending that is administrative are depicted for 2007-2017. The thicker middle line represents the national average while the three lines above in dark grey (Wyoming, California, and Washington) are the states with the highest administrative spending over this time period and the states with the lowest measure of administrative spending during this time are below in light grey (Mississippi, New York, Kentucky).

With respect to per-enrollee administrative expenditures, the national average fell from $458.33 in 2007 to $377.56 in 2017 (Figure 2). Throughout the study period, the lowest per-enrollee spending was $123.96 in Arizona in 2011 while the highest was $1148.43 in Alaska in 2012. In 2017, per-enrollee administrative expenditures ranged from $142.04 (Arizona) to $1,126.22 (North Dakota).

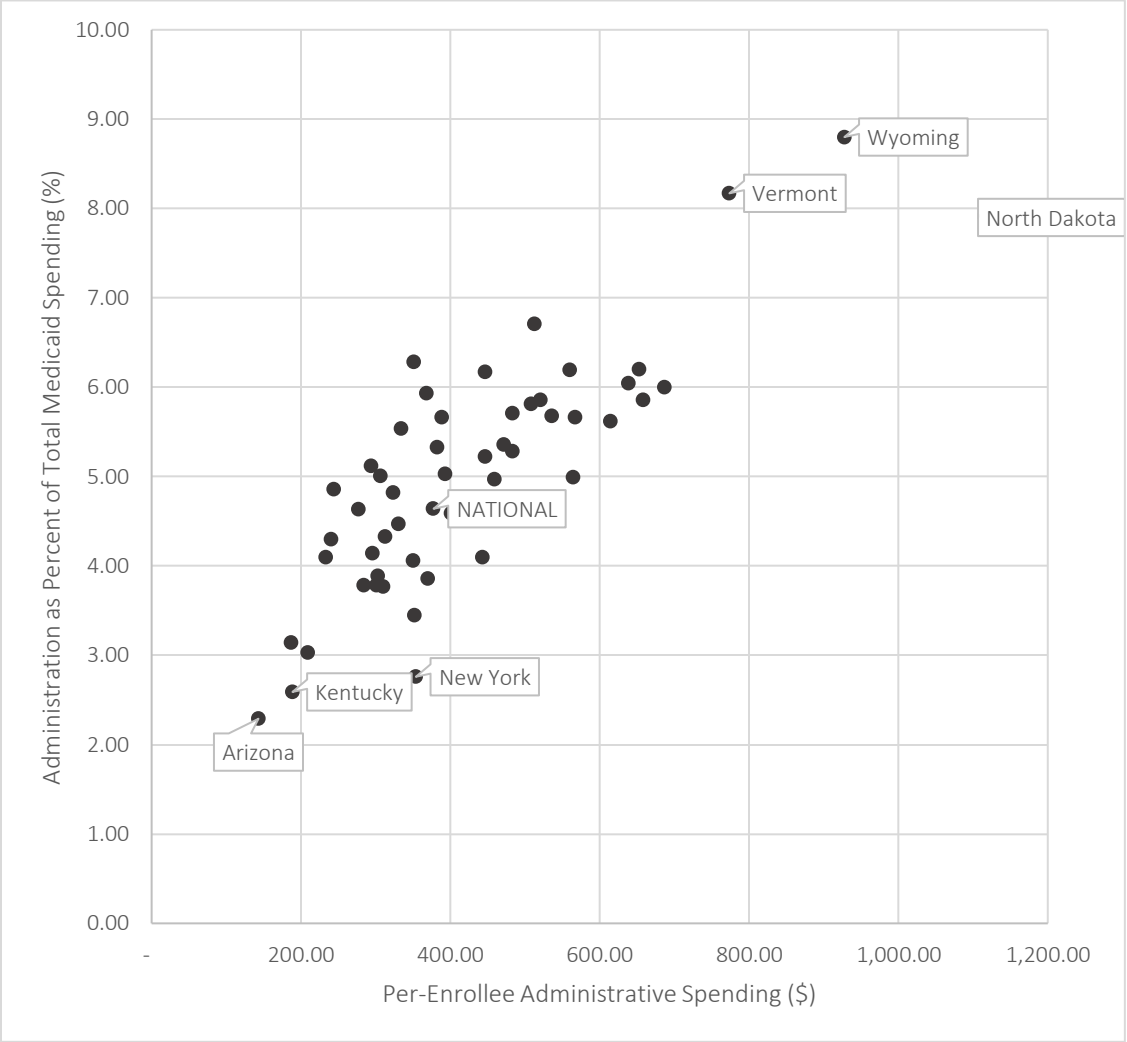
Figure 2. Trends in Per-Enrollee Administrative Expenditures



NOTE: State-level trends in the per-enrollee administrative are depicted for 2007-2017. The thicker middle line represents the national average while the three lines above in dark grey (North Dakota, Wyoming, and Alaska) are the states with the highest administrative spending over this time period and the states with the lowest measure of administrative spending during this time are below in light grey (Mississippi, Alabama, and Kentucky).

These two measures of administrative expenditures were highly correlated with each other (Pearson Coefficient=0.821), however states' rankings on each measure varied (Figure 3). For example, the largest difference in rank in 2017 was in Illinois where it ranked 48th in the percent of Medicaid expenditures that were administrative but 21st in per-enrollee administrative expenditures, representing a difference in rank of 27 positions. On average across the study period, there was a difference in rank of 6.5 positions between the two measures of administrative expenditures.

Figure 3. Cross-Sectional 2017 State Administrative Expenditures



In addition to variation in state administrative spending, state programmatic, political, economic and demographic characteristics varied during the study period (Table 1). Percent of enrollees covered by managed care increased from an average of 65.0% in 2007 to 77.6% in 2017. In terms of political characteristics, the percent of state budgets spent on Medicaid also ranged from 4.5% to 38.8, with an average of 22.8%. In addition, 53% of the state year observations had a republican governor in office. There were also differences in population demographics across states during the study period. For example, the percent of the population that is white ranged from 24.6% to 95.8% and the percent of the population that is Hispanic ranged from 1% to nearly 49%.

Table 1. Descriptive Statistics of Administrative Spending, Programmatic, Political, Economic & Demographic Characteristics

	Variable	Mean	Std. Dev.	Min	Max
ADMINISTRATIVE SPENDING (outcome variables)	Per Enrollee Administrative Spending (2017 USD)	$446.44	$177.87	$123.96	$1148.43
	Administrative Spending as a Percent of Total Spending (%)	5.03%	1.47%	1.70%	9.61%
PROGRAMMATIC CHARACTERISTICS	Percent Managed Care	73.6%	22.2%	0.0%	100.0%
	FMAP Match Rate (%)	61.4%	8.9%	50.0%	84.9%
	Parental Eligibility Policy (%FPL)	91.0%	55.4%	16.0%	275.0%
POLITICAL CHARACTERISTICS	Percent state budget spent on Medicaid	22.8%	6.3%	6.6%	38.8%
ECONOMIC & DEMOGRAPHIC CHARACTERISTICS	Unemployment Rate	6.3%	2.2%	2.4%	13.7%
	Percent population w/ Bachelor's or above	28.5%	5.1%	17.1%	43.4%
	Total population (millions)	6.40	6.99	0.52	39.54
	Percent Population Male	49.4%	0.7%	48.2%	52.7%
	Birth rate (per 1,000)	12.8	1.7	9.0	21.2
	Percent Population 65+	14.2%	2.0%	7.8%	20.1%
	Percent Population White	77.5%	12.6%	24.6%	95.8%
	Percent Population Black	10.6%	9.5%	0.3%	38.0%
	Percent Population Other	11.9%	10.9%	2.2%	73.9%
	Percent Population Hispanic	11.0%	10.1%	1.0%	48.8%

NOTE: Table includes all states for years 2007-2017, state-year observations with administrative expenditures in the top and bottom 1 percentile excluded. Washington DC not included.

Results from the state fixed effects regression analyses identified several state characteristics associated with both percent of total spending that is administrative and per-enrollee administrative expenditures (Table 2). For the model considering the percent of total spending that is administrative, several factors were negatively associated with this measure including percent enrolled in managed care (coef: -0.007, p-value: 0.023), FMAP match rate (coef: -0.019, p-value: 0.046), parental eligibility policy as a percent FPL (coef: -0.006, p-value: <0.0010), a non-Republican governor (coef: -0.215, p-value: 0.027), total state population (coef: -0.536, p-value: <0.001), and the percent of the population 'other,' non-Black races relative to the percent white (coef: -0.175, p-value: <0.001). In contrast, factors that were positively associated with percent of total spending that is administrative included birth rate (coef: 0.289, p-value:

0.008), percent of the population age 65 and older (coef: 0.347, p-value: 0.001), and percent of the population that is black (coef: 0.268, p-value: 0.041).

Table 2. Correlates of Medicaid Administrative Spending State Fixed Effects Regression Results

		Administrative Spending as a Percent of Total Spending	Per-Enrollee Administrative Spending
	Recession Indicators		
	Period 1: Before Recession (2007)	-0.001	0.29
	Period 2: During Recession (2008-2009)	ref	ref
	Period 3: Post-Recession (2010-2013)	-0.085	-24.54
	Period 4: Post-Recession & Post-ACA Implementation (2014-2017)	-0.366	-85.69***
PROGRAMMATIC CHARACTERISTICS	Percent Managed Care	-0.007*	-0.34
	FMAP Match Rate (%)	-0.019*	-1.16
	Parental Eligibility Policy (%FPL)	-0.006***	-0.46***
POLITICAL CHARACTERISTICS	Percent state budget spent on Medicaid	0.000	0.08
	Governor Democrat/Other	-0.215*	-22.31*
ECONOMIC & DEMOGRAPHIC CHARACTERISTICS	Unemployment Rate	0.008	2.55
	Percent population w/ Bachelor's or above	0.033	11.09
	Total population (millions)	-0.536***	-17.48
	Percent Population Male	0.046	22.99
	Birth rate (per 1,000)	0.289**	34.03**
	Percent Population 65+	0.347***	30.53**
	Percent Race		
	Percent Population White	ref	
	Percent Population Black	0.268*	45.61**
	Percent Population Other	-0.175***	-18.74***
	Percent Population Hispanic	0.152	-12.25
	Constant	-3.417	-1713.40

* p<0.05, ** p<0.01, ***p<0.001

NOTE: All state-year observations for 2007-2017 were included aside from those in which there was implausible expenditures data denoted by those in the top and bottom 1 percentile of expenditures values. Washington DC was not included in the analysis. Sensitivity analyses with different treatment of outliers is included in Appendix A. Sensitivity analyses with lagged political characteristics included in Appendix B.

Regression results for the dependent variable of per-enrollee administrative spending were similar in direction and significance with a few differences. Factors associated with lower

per-enrollee administrative expenditures include being in the Period 4 (2014-2017) relative to during the recession (coef: -85.69, p-value: <0.001), parental eligibility criteria as a percent FPL (coef: -0.463, p-value: 0.001), having a non-Republican governor (coef: -22.31, p-value: 0.034), and percent population 'other,' non-Black races relative to the percent white (coef: -18.74, p-value: <0.001). The greatest magnitude effect was for Period 4. During this time, administrative spending was nearly $86 lower per-enrollee than during the recession. Factors associated with greater per-enrollee administrative expenditures include birth rate (coef: 34.03, p-value: 0.004), percent of the population age 65 and older (coef: 30.53, p-value: 0.006), and the percent of the population that is Black (coef: 45.61, p-value: 0.001). Birth rate and percent of the population that is Black were associated with a $34 and nearly $46 higher per-enrollee administrative spending, respectively.

Results of both regression models were largely robust to sensitivity analyses considering different treatment of observations with implausible spending values and lagged versions of the percent of the state budget spent on Medicaid. The indicator for the governor's political affiliation was not significant in the model with this variable lagged. Results from these models can be found in Appendices A and B.

Discussion

This is the first study to assess variation in Medicaid administrative spending across states and time. Findings suggests that states vary in their administrative expenditures and several programmatic, political, economic, and demographic factors are related to Medicaid administrative spending across states. Notably, some of these factors are within the control of the state while others are not.

Factors associated with one or both measures Medicaid administrative costs that are largely outside of states' control include Period 4 (2014-2017). This period is associated with significantly lower per-enrollee spending compared to the recession period, but not for administrative costs as a percent of total Medicaid spending. During this time there were many

changes that occurred both within and outside of Medicaid that may be driving this finding. These changes include the many changes with the overall ACA implementation including the optional Medicaid expansion, the Medicaid change to using the 'Modified Adjusted Gross Income' (MAGI) for eligibility determinations, [2.36] and the transition from MSIS to T-MSIS for states to report data uniformly to CMS. [2.37] While these changes generally occurred nationally, some occur in different states at different times and the experience within the states may be different.

Also outside of state control is the negative association between FMAP match rate and administration as a percent of total spending. FMAP is calculated based on the average income in the state where those with lower average incomes have higher match rates. This finding that higher match rates are associated with lower administrative spending as a percent of total spending may reflect greater health needs of the population and therefore greater medical spending for these states.

The demographic characteristics of the state that are associated with administrative spending are also outside of the control of the state. Birth rate and the percent of the population age 65 and higher are associated with higher administrative spending on both measures. Both of these life stages entail individuals either being enrolled (i.e. pregnant women, newborns, and older adults living in long-term care) or unenrolled (i.e. individuals becoming eligible for Medicare and may lose Medicaid coverage). In addition, these life stages have higher health care utilization and expenditures which may also be contributing to this finding. [2.38–2.41]

The finding that higher proportions of state populations that is black is associated with higher administrative spending is also supported by other literature. Historically, Black individuals and families have experience more frequent changes in income which may affect Medicaid eligibility. [2.42, 2.43] A recent study considering churn in Medicaid after Medicaid expansion identified higher baseline rates of disruption in coverage and coverage loss as well as greater gains in coverage continuity among minority individuals after expansion. [2.44]

Several program and state characteristics that are within the control of the state were found to be related to administrative spending. Managed care coverage is associated with lower administrative spending as a percent of total spending. It would be expected that greater managed care coverage would be associated with lower administrative spending at least to Medicaid as states are able to shift some of these expenses to the managed care entity. In fact, early studies find that administrative spending is higher among Medicaid managed care entities than for Medicaid agencies [2.45–2.47] and these administrative costs to the managed care entity are not included in the data used for our study. The data used in previous recent work that identified a larger increase in administrative spending for Medicaid compared to Medicare or private insurers in recent years was driven by increases in other non-medical expenditures rather than those accrued by either state Medicaid agencies or CMS, which may also reflect this trend in managed care. [2.13, 2.48]

The parental eligibility policy is also negatively associated with percent of total spending that is administrative. This may reflect potential economies of scale, as more individuals become eligible and enrolled, the state Medicaid program becomes more efficient as reflected in administrative costs. There is some limited evidence that health insurance exhibits economies of scale in terms of administrative spending, but findings are not consistent across studies. [2.49–2.51]

Finally, having a non-Republican governor is associated with lower administrative expenditures for both measures. Historically, left-leaning states have prioritized Medicaid more so than right-leaning states, as evidenced by discretionary spending, Medicaid expansion decisions, and general support of Medicaid, which aligns with this finding. [2.7, 2.52, 2.53]

Limitations

While this is the first study to assess and describe variations in state-level Medicaid administrative costs, it has several important limitations. First, given the study design, we are only able to identify associations between state context and administrative costs, but not causal effects of how any of these factors may affect administrative spending. Second, this study only

considers differences in administrative spending but does not assess differences in efficiency or effectiveness of administrative spending. Importantly, this study does not assess appropriateness of varying levels of administrative spending or enrollment or other returns on administrative spending that may begin to assess efficiency of this spending. Future work that measures the effectiveness of administrative spending would help to provide a more comprehensive understanding of these relationships. Finally, there are numerous other variations in Medicaid that may be considered. This study aimed to include those that are available and suspected to be associated with administrative costs, but future studies may consider additional variations or more nuanced measures of administrative spending.

Conclusions

Overall, this study is the first to assess variations in and associations of state contextual factors with state Medicaid administrative expenditures. Findings from this study may begin to inform policy discussions around Medicaid program design and funding as we better understand factors within and outside of the states' control that may be related to administrative spending. This is particularly relevant as there continue to be discussions both at federal and state levels around efficiency and value of Medicaid. Future studies may consider additional variations in Medicaid programs and state contexts, decompose administrative spending further, and measure the efficiency of Medicaid administrative spending.

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CHAPTER THREE

EFFECTS OF MEDICAID EXPANSION ON STATE ADMINISTRATIVE EXPENDITURES

Introduction

Medicaid was established in 1965 as a combined federal and state program to provide health insurance to low income individuals and has grown to become the largest insurance provider in the country.[3.1] States were given flexibility to design and administer their programs within federal limits and as such, Medicaid programs vary greatly especially through their eligibility criteria for various populations. For example, in 2009 just prior to the passage of the Affordable Care Act (ACA), the eligibility limit for parents ranged from 17% of the Federal Poverty Level (FPL) in Arkansas to 275% in Minnesota.[3.2] In 2010, the ACA originally included the requirement for all states to expand eligibility criteria for adults to up to 138% of the federal poverty line (FPL) or they would lose federal matching funding. In an effort to support expansion, the federal government would also initially cover all medical costs for newly eligible individuals in expansion states for the first several years.[3.3] After a supreme court case evaluating the constitutionality of requiring Medicaid expansion, it became optional for states.[3.4] Since the initial expansions in January of 2014, a total of 37 states including Washington, DC have expanded Medicaid.[3.5]

Medicaid expansion has increased enrollment for both newly and previously eligible populations[3.6–3.8] which in turn has increased federal spending on Medicaid.[3.9] Although enrollment effects of expansion have been well-established in the literature, other outcomes including expenditures have been less studied.[3.7, 3.8] One recent study found that while Medicaid expansion increased total federal spending on Medicaid, the federal funding shielded states from significant adjustments to their budgets.[3.9] They also found no evidence that expansion negatively impacted other areas of state budgets such as education or transportation.[3.9] Two other studies of the financial implications of Medicaid expansion found increases in hospital revenue from

Medicaid [3.10] and lower levels of spending for newly eligible enrollees compared to those previously eligible. [3.11] While many of studies of the effects of expansion considered expansion dichotomously, a few studies use more nuanced measures of expansion by size and nature to better capture some of the variation in expansion approaches. [3.12–3.15] Findings from these studies that effects of expansion vary even among expansion states and by size and the nature of expansion highlight the need consider more granular measures of expansion. Despite the substantial body of evidence around the many effects of Medicaid expansion, no studies have yet considered the effects on administrative spending. This type of spending includes eligibility and enrollment assessments and processes and unlike medical expenditures was not differentially reimbursed in expansion states.

This study used a quasi-experimental approach to estimate the effect of Medicaid expansion on administrative costs. In addition, differences in effects of expansion by the type of expansion and the size of the expansion are considered. Findings from this study will help to better understand the financial implications of Medicaid expansion decisions and will be of interest to policymakers as they reflect on or consider future expansions as well as those considering other program modifications.

Methods

This study used a generalized difference-in-differences (DID) approach in order to estimate the effects of Medicaid expansions on administrative costs.

Population & Data

This study utilized administrative costs for all 50 states from 2007-2017 and will rely on data from a variety of public sources at the state-year level. Medicaid financial data was obtained from CMS Form 64 of state annual Medicaid expenditures. [3.16] Enrollment data was obtained from the Kaiser Family Foundation (KFF) [3.17, 3.18] and Medicaid reports. [3.19] Program characteristic data including expansion status and size of expansion were obtained from various KFF reports. [3.5, 3.20–3.23] State demographic, economic, and political characteristics are from the U.S. Census

Bureau, [3.24] American Community Survey, [3.25] Current Population Survey, [3.26] CDC WONDER, the National Governors Association, [3.27] and the National Association for State Budget Officers. [3.28]

Measures

Dependent variables included the per-enrollee administrative expenditures and the percent of total expenditures that are administrative. Administrative expenditures are defined by CMS and are reported by each state annually. Per-enrollee estimates of administrative expenditures were calculated using state Medicaid enrollment from KFF reports for the month of June in years 2007-2013 and CMS's Medicaid Budgets & Expenditures System reports for years 2014-2017. All expenditures were adjusted to 2017 USD. While the data does change sources, it changes for all states in 2014 and does not differentially affect states based on expansion status. Additionally, upon review, enrollment trends appear to be smooth as the data transitions between these different sources. Due to a few state-year observations with improbable administrative spending values, we excluded the top and bottom one percentile of observations from the analysis.

The primary independent variable of interest is expansion status from KFF's Medicaid expansion tracker in a given state and year. While there are states that expanded early, these expansions were much smaller and are still considered to have implemented full expansions in 2014 or later. [3.29, 3.30] As in previous studies, only the main expansions were considered. [3.29, 3.30] A state-year observation was considered an expansion observation if expansion was implemented for at least half of the year in that state. More detail on expansion status by states can be found in Appendix C.

Other independent variables include a variety of state economic and demographic, political, and programmatic characteristics. State characteristics include unemployment rate from the Bureau of Labor and Statistics, birth rate (per 1,000) from CDC WONDER, and total population (in millions), percent of population with at least a bachelor's degree, percent of the

population age 65 and older, percent of the population white, Black, all other races, and percent Hispanic from American Community Survey. Political characteristics include the governor's political affiliation from National Governor's Association rosters and the percent of the state budget spent on Medicaid from the National Association for State Budget Officers. Program characteristics include percent managed care enrollment, the Federal Medical Assistance Percentage (FMAP) match rate, and the percent FPL eligibility criteria for parents all from KFF reports.

Analyses

A generalized DID approach was used to estimate the difference in the change in administrative expenditures for expansion states from before to after expansion compared to the change in administrative expenditures non-expansion states during the same time period.[3.31] Like the traditional DID, this approach is intended to estimate causal effects of an exogenous policy change, however, it builds upon the traditional DID in that it considers differences in the timing of the intervention across states using two-way fixed effects.[3.31] In order for this approach to be appropriate, the treatment (i.e. the expansion states) and control (i.e. non-expansion states) must exhibit parallel trends in the pre-intervention periods which was assessed both graphically and statistically. Parallel trends were assessed by estimating linear regressions for each measure of administrative spending with individual interaction terms between each year and a binary indicator for that state expanding during the study (Appendix D). The interaction between 2013 and expansion status was omitted as a reference as it was the last full year prior to the main expansions. Subsequently, a joint-F test was conducted to assess whether all pre-expansion year-expansion interactions were jointly non-significant. Analyses used linear models of per-enrollee administrative expenditures and percent of total administrative expenditures that are administrative as a function of the contemporaneous expansion status, state, political, and programmatic characteristics.

In order to assess any differing effects due to variations in expansions, secondary analyses considered the use of 1115 demonstration waivers and the relative size of the expansions. Waivers allow states to modify their programs in ways that are outside of federal Medicaid regulations. Several states used 1115 waivers to expand their programs in ways that differed from the initial ACA provision, such as requiring premiums. Early evidence of some of these waiver expansions suggest that they may have differentially affected enrollment and have added additional requirements for the states to maintain enrollment [3.13, 3.15, 3.32] and therefore may affect administrative expenditures differently. Waiver states include Arkansas, Indiana, Iowa, Michigan, and Montana. Separate DID models considered waiver expansion states vs all non-expansion states and separately, all ACA expansion states vs all non-expansion states.

Due to differences in eligibility criteria prior to expansion, we considered differences in the effects of expansion on administrative costs by the size of expansion. We used the uninsurance rate for the non-elderly, adult population below 100% FPL in the last full year prior to expansion from KFF [3.23] as a proxy for the potential size of the expansion as this whole population should have become eligible in expansion states. We then divided expansion states into either large or small expansions by being either above the median uninsurance rate for this population in the year prior to expansion among expansion states. Stratified models were used to consider expansion effects on administrative spending between large expansion states and all non-expansion states as well as small expansion states compared to all non-expansion states. More detail on expansion size can be found in Appendix E.

Additional sensitivity analyses were also conducted to ensure the robustness of the findings to analytic decisions. First, the main model was run with only the post-recession years included (2010 and beyond). Second, we considered lead and lag models to test the results and to assess whether there are either anticipatory or reactive effects of expansion on administrative expenditures. These models are the same as the main model, but with the expansion indicator changed to one year earlier (lead) or one year later (lag). Third, we reconsidered size of expansion

using the average uninsurance rate for the non-elderly, adult population below 100% FPL instead of the median. The only difference between these two measures of expansion size is whether North Dakota is considered large or small.

Results

Expansion and non-expansion states exhibited similar trends in both measures of administrative spending the pre-expansion period (Figures 4 and 5). While expansion states have historically had higher per-enrollee administrative spending than non-expansion states, the percent of total spending that is administrative exhibits the opposite.

Figure 4. Trends in Per-Enrollee Administrative Spending by Expansion Status

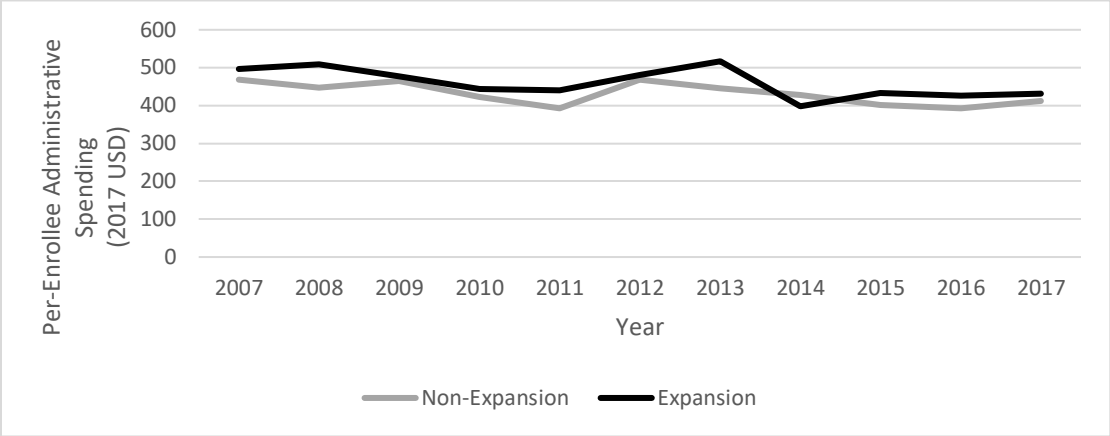
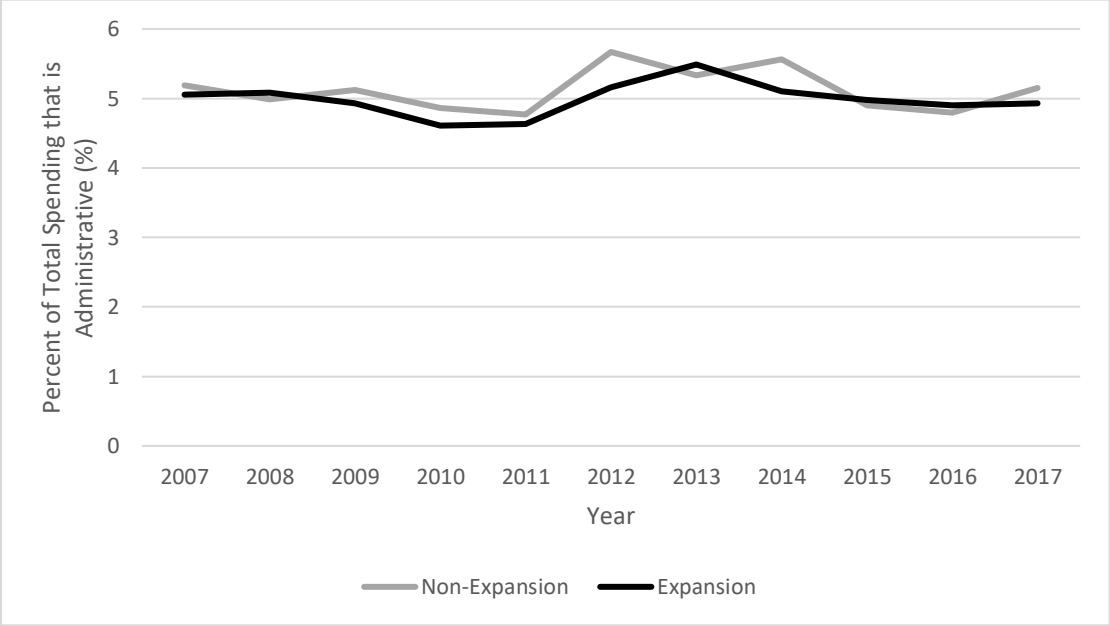


Figure 5. Trends in Percent of Total Spending that is Administrative by Expansion Status



In addition to graphical assessment, formal tests of the parallel trends assumption required for DID approaches confirmed parallel trends in pre-expansion years for both measures of administrative spending. Full results from this analysis can be found in Appendix D.

On average, per-enrollee administrative spending in non-expansion states decreased $35.60 after 2014 from $444 to $405 (Table 3). Expansion states generally exhibited a larger magnitude decrease in per-enrollee administrative spending compared to non-expansion states according to most expansion type and size classifications. The largest decrease in per-enrollee

administrative spending for a classification of expansion states was among states with large expansions who exhibited an average $106 decrease after expansion from $508 to $402. States with small expansions experienced a slightly smaller decrease of $21.

Table 3. Comparisons of Pre and Post Expansion Administrative Spending between Non-Expansion and Various Expansion Types

Population of States	Per-Enrollee Administrative Spending (2017 USD)			Percent of Total Spending that is Administrative (%)		
	pre-expansion	post-expansion	unadjusted difference	pre-expansion	post-expansion	unadjusted difference
Non-Expansion	444.11	408.51	-35.6	5.13	5.11	-0.02
All Expansion	482.24	414.38	-67.86	5.04	4.91	-0.13
Waiver Expansion	473.71	415.99	-57.72	5.15	5.07	-0.08
ACA Expansion	484.54	414.04	-70.5	5.01	4.87	-0.14
Large Expansion	507.84	401.48	-106.36	5.52	5.05	-0.47
Small Expansion	449.98	428.99	-20.99	4.41	4.74	0.33

Changes in the percent of total spending that is administrative show similar differences from pre- to post-expansion. Non-expansion states had a slight decrease from 5.13% of total spending being administrative before 2014 to 5.11% after 2014. Unadjusted pre-to-post comparisons for most populations of expansion states again exhibited larger decreases however there was an increase in the percent of spending that is administrative for states that had a small expansion from 4.41% to 4.74%. Notably, states with small expansions also began with spending a lower proportion of total spending on administration than both non-expansion states and all other classifications of expansion states.

Results from the main, adjusted DID analysis comparing all expansion states to non-expansion states showed a slightly lower but non-significant difference in the change in per-enrollee administrative spending in expansion states compared to non-expansion (Table 4). Separate comparisons of states that expanded using a waiver to non-expansion states and ACA

expansion to non-expansion states also suggest no significant effect of expansion on per-enrollee administrative spending.

Effects of expansion when stratifying by expansion size depict different effects. When compared to non-expansion states, states with large expansions experienced a significantly greater reduction in per-enrollee administrative spending of $77 (p-value: 0.048). In contrast, states with small expansions exhibited a modest increase in per-enrollee administrative spending after expansion compared to non-expansion states (coef: $50.56, p-value: 0.080). Full results from these analyses can be found in Appendix F.

Table 4. Adjusted DID Regression Results for Effects of Expansion on Administrative Spending

	Model Comparison	Effect of Expansion on Per-Enrollee Admin Spending (2017 USD)		Effect of Expansion on Percent of Total Spending that is Administrative (%)	
		coef.	p-value	coef.	p-value
MAIN MODEL	All expansion vs non-expansion	-12.37	0.651	0.12	0.567
Stratified Models	Waiver expansion vs non-expansion	-19.09	0.683	0.09	0.836
	ACA expansion vs non-expansion	-10.99	0.704	0.10	0.664
	Large expansion vs non-expansion	-77.08	0.048	-0.41	0.127
	Small expansion vs non-expansion	50.56	0.080	0.66	0.009

Note: Results are from generalized difference-in-differences models using two-way state and year fixed effects and robust standard errors clustered at the state level. All analyses control for the state demographic, economic, political, and programmatic characteristics described. Results from the full models can be found in Appendix F. Observations with administrative spending values in the top and bottom 1 percentile were omitted from the analysis.

The main analysis comparing changes in the percent of total spending that is administrative between all expansion and non-expansion states after expansion show a non-significant increase (coef: 0.12 percentage points, p-value 0.567). Similarly, expansion showed no effect on this measure of administrative spending when comparing either waiver expansion states or ACA expansion states to non-expansion states.

States with large expansions exhibited a non-significant reduction in percent of spending on administration compared to non-expansion states, however states with small expansions showed a significant increase in this measure after expansion compared to non-expansion states (coef: 0.66 percentage points, p-value: 0.009).

Additional models considering only the post-recession time period (2010-2017), anticipatory effects of expansion, and reactive effects also show no significant effect of expansion on either measure of administrative spending (Appendix G).

There are slight differences between results when the average uninsurance rate pre-expansion is used to model the size of the expansion instead of the median as presented, but only for per-enrollee administrative spending. In the median cutoff model presented earlier, states with large expansions had significant reductions in administrative spending compared to non-expansion states post-expansion (coef: -77.08, p-value: 0.048). When the average cutoff is used to differentiate states with small and large expansions, there is a more modest decrease for states with large expansions (coef: -66.95, p-value: 0.077). Additionally, there was a modest increase in per-enrollee administrative spending for states with small expansions compared to non-expansion when using the median cutoff (coef: 50.57, p-value: 0.080) but models using the average cutoff show a significant increase (coef: 58.61, p-value 0.028).

Discussion

Using a quasi-experimental design, our study found limited effects of Medicaid expansion on Medicaid administrative spending. More specifically, there is no statistically significant effect of expansion when considering all expansion states, waiver expansion states only, or ACA expansion states only relative to all non-expansion states. However, statistically significant differences are observed when the size of the expansion is considered. There is modest evidence suggesting states with large expansions saw reductions in administrative costs after expansion relative to non-expansion states while states with small expansions incurred increases in administrative costs after expansion.

Findings from this study contribute to the growing body of rigorous evidence of the effects of Medicaid expansion including increased access to care, health status, reduced mortality, and financial implications.[3.7, 3.8, 3.33, 3.34] In addition, a few studies have begun to consider more nuanced variations in Medicaid programs beyond simple expansion or not,[3.13–3.15, 3.32, 3.35] and findings from our study reinforce the need for such approaches.

There are many possible reasons for this difference in effect by expansion size. States with larger expansions may experience economies of scale, where it becomes less expensive and they become more efficient as more individuals are enrolled in the program. Early work across commercial health insurance and Medicare provide some evidence that various components of health insurance administrative expenditures may benefit from economies of scale, however not all studies find economies of scale.[3.36–3.38]

The increase in administrative spending in small expansion states after expansion compared to non-expansion states may be driven by different reasons. First, reimbursement rates for Medicaid vary geographically by region and expansion decisions and size is also more common in certain regions. In addition, states with small expansions have generally had more generous Medicaid programs.[3.35] It is important to note that differences in administrative expenditures alone does not assess the efficiency or effectiveness of those administrative dollars. States with higher administrative spending may be either unnecessarily spending more or achieving more with each dollar. Future research is needed to understand the implications of administrative spending on enrollment.

Additionally, while 36 states and Washington, DC have implemented Medicaid expansion after the ACA, the remaining states have yet to expand. Historically, expansion decisions have largely been driven by state politics and interest groups, rather than need.[3.39–3.42] However, there appears to be increasing support from previously reluctant states.[3.43, 3.44] On average, the states that have not expanded would have large expansions as they generally have low eligibility thresholds for parents, childless adults are not eligible, and they have high

uninsurance rates. [3.45, 3.46] Findings from our study suggest they may be more likely to see greater reductions in administrative costs in terms of per-enrollee administrative spending and percent of Medicaid spending that is administrative. As states that have not expanded continue to be consider expansion, [3.5] the growing body of evidence that expansion has beneficial effects on access to care, some measures of health, and potential financial benefits is important to consider.

Limitations

This is the first study to assess the effects of Medicaid expansion on administrative spending, however it is not without limitations. First, main results consider the effects of expansion on these two measures of administrative spending but cannot assess the efficiency or appropriateness of spending. Second, most expansions were implemented in 2014 during the same year which many other provisions of the ACA were being implemented. These could be contributing to some of our results, but only if other ACA provisions are happening differentially in expansion and non-expansion states.

Conclusions

In summary, our study provides rigorous evidence on the effects of Medicaid expansion on administrative expenditures. More specifically, it appears as though states were largely able to expand Medicaid without differentially affecting administrative spending compared to non-expansion states with the exception of small expansion states. Findings from this study may better inform discussions within states considering additional modifications to their Medicaid programs, particularly those that would have a large potential expansion. Additionally, our study provides additional evidence that variations across expansions may be important to consider in order to provide a more comprehensive understanding of the effects.

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CHAPTER FOUR

EFFECTS OF EXPRESS LANE ELIGIBILITY ON MEDICAID ADMINISTRATIVE EXPENDITURES

Introduction

Medicaid and the Children's Health Insurance Program (CHIP) provide insurance coverage for nearly 36 million children in the US,[4.1] yet 5% of children were uninsured nationally in 2017.[2] State-level child uninsurance rates ranged from 1% in Massachusetts to 11% in Texas.[4.2] Historically, over half of children that are uninsured are eligible for Medicaid or CHIP in their states but remain uninsured due to enrollment barriers and lapses between coverage as eligibility changes.[4.3–4.6] Numerous recent efforts, including the Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA), have attempted to support enrollment and insurance coverage for children.[4.6] One change included in CHIPRA was federal support of Express Lane Eligibility (ELE). This program allows for state agencies other than Medicaid and/or CHIP to identify children who are potentially eligible for Medicaid or CHIP. State agencies which may serve as partners for ELE include the Supplemental Nutrition Assistance Program (SNAP), Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the National School Lunch Program (NSLP), and state tax agencies.[4.7] It was anticipated that in addition to streamlining child health insurance enrollment, ELE may also result in administrative savings.[4.8, 4.9] In 2016, 14 states had some form of ELE in place.[4.10]

CHIPRA provides states with great flexibility in designing their own ELE processes. ELE programs vary in terms of use within Medicaid and/or CHIP, with which other state agencies are involved, whether ELE is used for preliminary determinations and/or redetermination, and the use of automatic enrollment.[4.8, 4.13, 4.14] As an optional and novel program with varying structures, CHIPRA required that ELE programs be subject to evaluations. These evaluations and subsequent additional evidence have identified differences in the effectiveness of ELE programs by state and ELE structure.[4.8–4.10, 4.15] Overall, ELE resulted in a widespread increase in

enrollment across ELE implementation states, with the greatest enrollment gains among states with automated systems rather than simplified applications or procedures.[4.8, 4.9, 4.15–4.18] While it is clear that there are enrollment gains associated with ELE, administrative savings appear to be less consistently considered, have somewhat mixed results, and analyses and data contain limitations.[4.8–4.10] More specifically, one of the required evaluations found cost savings for states with automated enrollment through ELE, however those with simplified applications or processes did not experience these same gains.[4.8] In addition, there are initial costs to implementing automated enrollment but recurring costs for those with simplified approaches.[4.8] Studies that consider effects of ELE on administrative costs identify limitations of these data and analyses including a short follow up period, relying on qualitative assessments and limited available data, are often subject to recall bias, and inability to consider more recent ELE implementations.[4.7–4.9, 4.15]

The purpose of this study is to estimate the effects of ELE on Medicaid administrative costs. We will exploit variation in implementation of any ELE as well as variation among ELE programs such as by the use of automatic enrollment and use for initial determination or redeterminations. This study will improve upon previous work by considering additional years of data, new state ELE implementations that have not been included in previous studies, and considering objective administrative costs, an outcome that has been rare in prior studies. Findings from this study will be of interest to state and federal policy makers involved in Medicaid and CHIP program design, those interested in children's access to health insurance, and the continued political dialogue about the US healthcare system at large, including the emphasis on value, cost, and efficiency.

Methods

This study used a quasi-experimental design with data from all 50 states from 2007-2017 in order to estimate the effects of ELE on child enrollment and administrative costs.

Population & Data

Medicaid administrative expenditures were compiled from CMS form 64 which reflects annual expenditures, divided into medical and administrative spending.[4.19] ELE data was compiled from various sources including the CMS ELE tracker,[4.20] state Medicaid Plan Amendments,[4.21] and the 2016 Office of the Inspector General Report.[4.10] State demographic and economic characteristics were obtained from American Community Survey,[4.22] Current Population Survey,[4.23] US Census Bureau,[4.24] and CDC WONDER.[4.25] Political characteristics were obtained from the National Governors Association[4.26] and National Association of State Budget Officers.[4.27] Medicaid and CHIP program characteristics will be obtained from various KFF reports.[4.28–4.30]

Measures

Dependent variables include two measures of administrative spending; per-enrollee administrative spending and the percent of total spending that is administrative. All spending values were adjusted to 2017 USD. State year observations in the top and bottom 1 percentile of each of these measures were removed from analyses as they represent implausible values.

The primary independent variable will be the use of ELE within a state-year observation. Additional analyses will use ELE approach instead, characterized by ELE use for preliminary determination or redetermination, and automatic enrollment, simplified application, or simplified process. Due to some differences in ELE implementation characteristics and dates across sources, four state-year observations were excluded because of unreconcilable differences. A more detailed description of ELE data can be found in Appendix H.

Control variables will include state demographic, economic, political, and programmatic characteristics. These characteristics were selected because of their known associations with Medicaid expenditures and enrollment. Demographic characteristics will include the total population of the state, percent of the state that are above 65, number of live births per 1,000 as a measure of growth for the state. Economic characteristics will include the poverty and

unemployment rates. Political characteristics will include the political affiliation of the governor and percent of the state budget spent on Medicaid. Programmatic characteristics will include eligibility criteria for parents as a measure of program generosity, the match rate for medical expenditures, and Medicaid expansion status after the Affordable Care Act.

Analyses

In order to estimate the effects of differently timed ELE implementations, we will use a generalized difference-in-differences (DID) approach to compare the change in administrative spending and enrollment in states that implemented ELE compared to those who did not. This approach uses two-way fixed effects in order to address the differences in timing of the intervention across states. Analyses will include previously described state demographic, economic, political, and programmatic characteristics as covariates in the models. A total of four models were included; the first set will estimate the effect of ELE overall on each of the two expenditure measures and the second set of analyses will consider the effect of specific ELE approaches commonly used by states for each of the expenditures measures. Sensitivity analyses were conducted to consider differences in ELE implementation data across sources as well as to exclude years post Medicaid expansions to ensure expansion decisions or implementations were not driving any results of the effects of ELE.

Because early evidence of ELE suggested there may be an initial increase in administrative spending to implement the program followed by an expected decrease, we also consider changes in the effect overtime. However, due to the variation that exists in ELE approach and the relatively few state-years with each ELE approach type, consideration of the non-linear effects of implementing ELE will be presented descriptively.

Results

During our study period, 10 states implemented some form of ELE in their Medicaid programs (Alabama, Colorado, Georgia, Iowa, Louisiana, Maryland, Massachusetts, New Jersey, Oregon, and South Carolina, Table 5). Of those, 4 included some form of automated enrollment

and 2 used ELE for both initial and redeterminations. The most common ELE partnering agency was SNAP followed by TANF. The two most common ELE approaches were a simplified process or procedure for initial determinations (n=33 state-year observations) and automated ELE for both initial and redeterminations (n=12 state-year observations). No other ELE approach represented more than 10 state-year observations and thus all other ELE approaches were categorized as ‘other ELE approach’ (n=21 state-year observations).

Table 5. Descriptions of ELE Approach by State

State	Description of ELE Approach
Alabama	• Simplified for initial determinations with SNAP & TANF starting in 2010 • Simplified for redeterminations with SNAP & TANF starting in 2009, transitions to automated in 2013
Colorado	• Automated for initial determinations with NSLP starting in 2013
Georgia	• Simplified for initial determinations with WIC starting in 2011, ends in 2016
Iowa	• Simplified for initial determinations with SNAP starting in 2010
Louisiana	• Automated for initial determinations with SNAP starting in 2010 • Automated for redeterminations with SNAP starting in 2010
Maryland	• Simplified for initial determinations with state tax agency starting in 2008 • Unclear if stopped in 2016-2017, these years excluded from analysis
Massachusetts	• Automated for redeterminations with SNAP starting in 2012
New Jersey	• Simplified for initial determinations with state tax agency starting in 2009 • NSLP added in 2011
Oregon	• Simplified for initial determinations with SNAP starting in 2010 • Unclear if stopped in 2016-2017, these years excluded from analysis
South Carolina	• Automated for initial determinations with SNAP and TANF starting in 2012 • Automated for redeterminations with SNAP and TANF starting in 2011

There are some differences in economic, demographic, political, and programmatic characteristics between states with ELE compared to those without and as such, all characteristics considered were included in regression models (Table 6).

Table 6. Descriptive Statistics for States with no ELE Compared to Any ELE During the Study Period

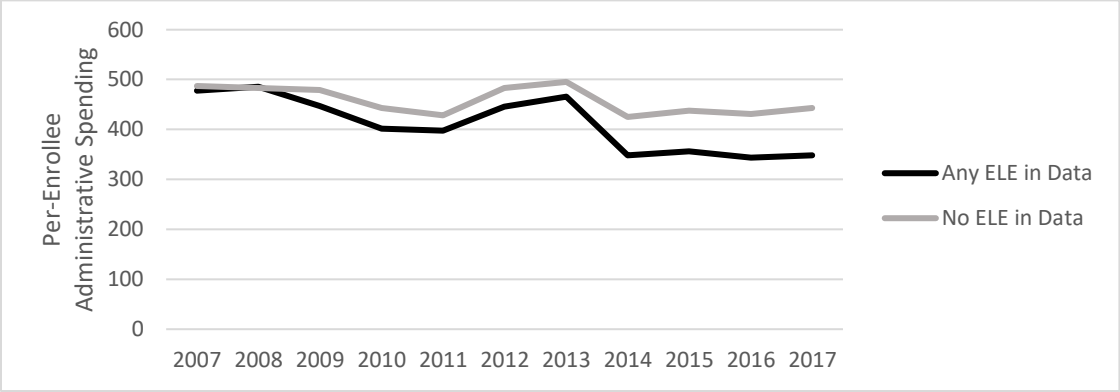
	No ELE (n=451)		**Any ELE** (n=110)		**p-value**
	mean or count	SD or %	mean or count	SD or %	
Per-Enrollee Admin Spending	457.87	180.08	410.53	180.22	0.014
Percent of Total Spending Admin	5.13	1.54	4.69	1.21	0.005
Percent Managed Care	71.2	24.4	79.4	14.3	<0.001
Expanded Medicaid	93	20.60%	26	23.60%	0.49
FMAP Match Rate	61.6	8.9	61.1	9.2	0.61
Parental Eligibility Policy %FPL	95.7	59.13	89.2	50.3	0.29
Percent of State Spending on Medicaid	23.0	6.8	21.2	3.7	0.009
Governor Democrat/Other	214	47.50%	48	43.60%	0.47
Unemployment Rate	6.2	2.2	6.5	2.1	0.24
Percent Bachelor's Degree or Above	28.6	5.9	30.7	6.5	0.001
Total Population millions	6.3	7.7	5.8	2.1	0.51
Percent Population Male	49.4	0.8	49.0	0.6	<0.001
Birth Rate per 1,000	12.9	1.8	12.6	1.1	0.085
Percent Population Age 65+	14.2	2.1	13.8	1.7	0.1
Percent Population White	78.0	13.9	72.8	11.1	<0.001
Percent Population Black	9.6	9.9	17.6	12.2	<0.001
Percent Population Other	12.5	11.8	9.6	4.4	0.013
Percent Population Hispanic	11.1	10.7	9.7	5.7	0.17

NOTE: Table shows descriptive comparisons of variables for states that never implement ELE in the study period and those that implement ELE at some point between 2007-2017. Table presents means of continuous variables with standard deviations and counts of categorical variables with percentages. Statistical significance in differences between non-ELE and ELE states from bivariate analyses is shown with p-values.

At the beginning of the study period, per-enrollee administrative expenditures were similar for states who never implemented ELE compared to those who eventually implemented some form of ELE (Figure 6). On average, per-enrollee administrative expenditures in 2007 were $487 for states that never implemented ELE and $477 for states who implemented ELE sometime after 2007 (both adjusted to 2017 USD). Over the study period, there was an average decrease in

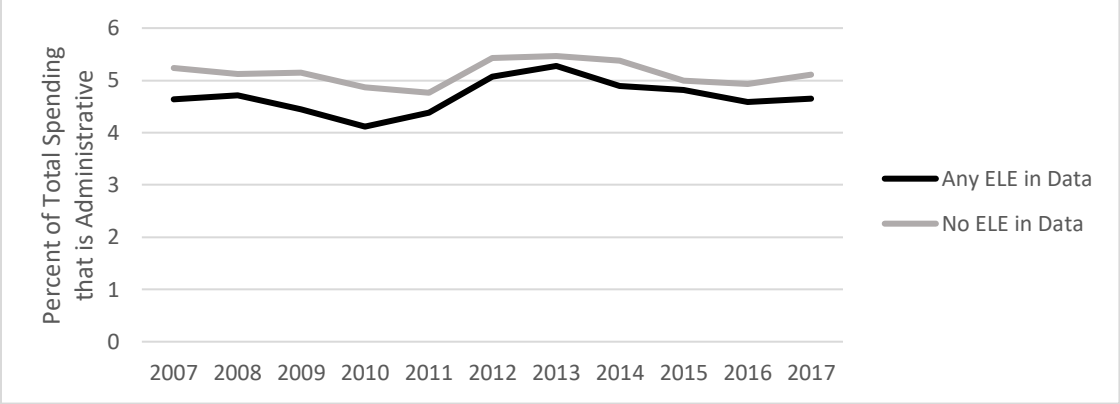
per-enrollee expenditures for both states with ELE and states without, however there was a greater decrease in states with some form of ELE.

Figure 6. Trends in Per-Enrollee Administrative Spending by Ever ELE Status



The percent of total spending that is administrative was lower in states with any ELE at some point than those who never implemented ELE for all years of the study period (Figure 7).

Figure 7. Trends in Percent of Total Spending that is Administrative by Ever ELE Status



Using the most general measure of any ELE, regression results estimate no effect of any ELE on per-enrollee spending (coef: -10.80, p-value: 0.58, Table 7). When considering the ELE approach (none, simplified for initial determinations, automated for both initial and redeterminations, and other ELE) there is a significant decrease in per-enrollee spending after simplified for initial determinations was implemented (coef: -45.54, p-value 0.007). In contrast, there are significant increases after implementing automated ELE for both initial and redeterminations (coef: 66.17, p-value: 0.001). There is no effect of other ELE approaches on per-enrollee spending approaches (coef: 14.84, p-value: 0.509).

Table 7. Regression Results for Effects of ELE on Administrative Spending

	PER-ENROLLEE ADMIN SPENDING MODELS				PERCENT OF TOTAL SPENDING ADMIN MODELS			
	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	Any ELE		ELE approach		Any ELE		ELE approach	
	coef	p-value	coef	p-value	coef	p-value	coef	p-value
ELE active								
No ELE	ref	ref			ref	ref		
Any ELE	-10.80	0.575			0.36	0.060		
ELE Approach								
No/pre-ELE			ref	ref			ref	ref
Simplified, initial			-45.54	0.007			-0.03	0.841
Auto, both			66.17	0.001			1.32	<0.001
Other ELE			14.84	0.509			0.54	0.004

Note: All regression models include state and year fixed effects, state-clustered standard errors, and controls for demographic, economic, political, and programmatic, characteristics. Full regression results can be found in Appendix I.

Findings from the regression model for the percent of total spending that is administrative estimate a non-significant increase in effect of any ELE coef: 0.36, p-value: 0.06). There was a significant increase in percent of total spending that is administrative after implementation of automated ELE for both initial and redeterminations (coef: 1.32, p-value: <0.001) as well as for other ELE approaches (coef: 0.54, p-value: 0.004) compared to no ELE. There is no effect of simplified ELE for initial determinations compared to no ELE (coef: -0.03, p-value 0.841). Results from sensitivity analyses are largely consistent with the main models presented here. Findings from sensitivity analyses can be found in Appendix J.

In order to further investigate differences in the effects of ELE by approach and over time, we summarize average spending in each year post-ELE implementation by ELE type (Figures 8 and 9). All ELE types appear to see a slight increase after implementation followed by a decrease for both measures of administrative spending.

Figure 8. Post-ELE Implementation Trends in Per-Enrollee Administrative Spending by ELE Approach

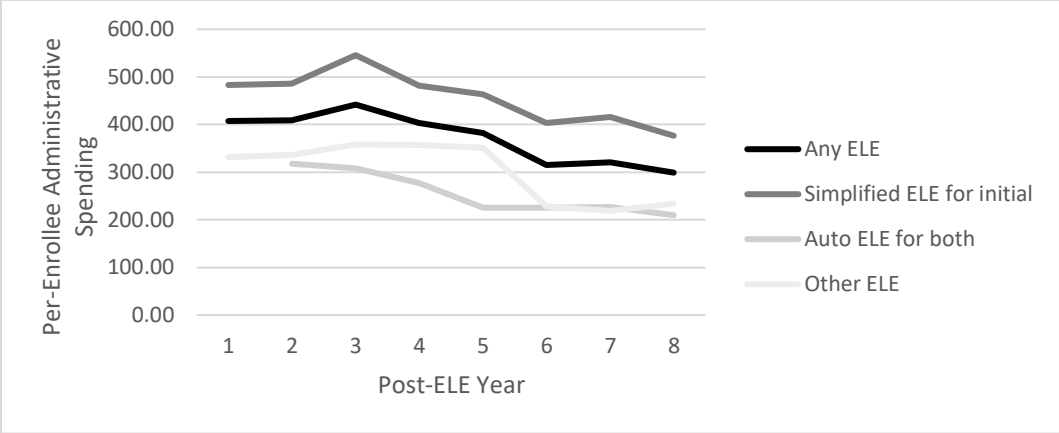
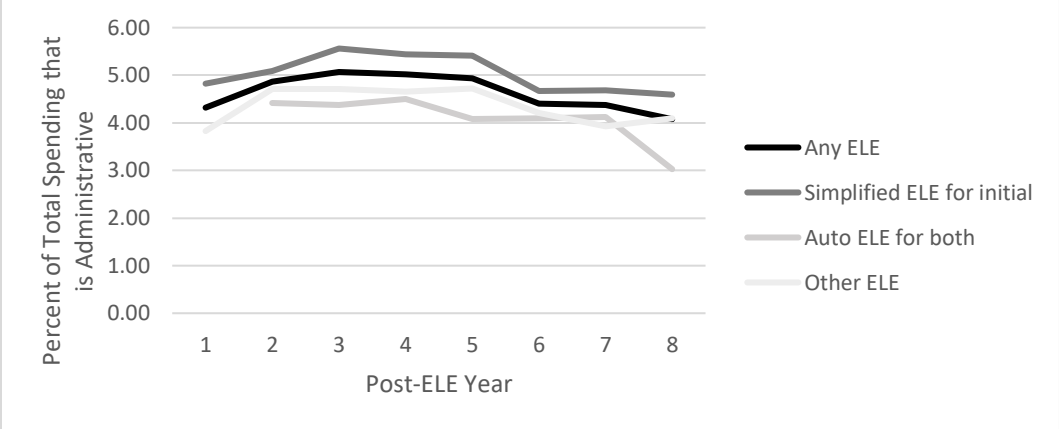


Figure 9. Post-ELE Implementation Trends in Percent of Total Spending that is Administrative by ELE Approach



Discussion

Previous work has identified greater enrollment in Medicaid and CHIP as a result of ELE, however the effects on administrative spending appear mixed and less frequently studied.[4.8, 4.9, 4.15–4.18] The current study builds off of the existing evidence of consider nuances of ELE for a longer time frame. Our study finds that while there is no overall effect of ELE on administrative spending, implementing ELE in various ways may result in greater increased administrative spending.

In early reports assessing the impacts of ELE, the use of automated enrollment was found to be associated with the greatest cost savings however it required start-up costs to implement.[4.8, 4.10] Our regression findings generally align where automated ELE for both initial and redeterminations is associated with increases in administrative spending.

Importantly, while our findings overall identify either no effect of ELE on administrative spending or increases in administrative spending which are contradictory to previous work and the anticipated effects of the program, it should be noted that states with ELE in any form have lower administrative spending than states with no ELE. Even with some significant increases in administrative spending after ELE, states with automated ELE for both initial and redeterminations have among the lowest administrative spending in the post period. In addition, after ELE implementation, there appears to be a pattern of increased administrative sending followed by a decrease for all ELE approaches. This may reflect earlier findings that there is an initial investment required in order to achieve savings relating to ELE.

Findings from the current study not only contribute to our understanding of the ELE program overall but underscore the need to evaluate Medicaid program modifications in a thorough way. With such vast approaches to ELE it is likely that heterogeneous effects occur and it is critical to understand them in order to make future decisions about these programs. In addition, this is one of many recent options to promote collaborations between Medicaid and other state agencies. For example, Massachusetts, New York, and Alabama have implemented ELE for parents through an 1115 waiver.[4.10] Other examples include Medicaid agencies across the country working with corrections departments to help facilitate enrollment after release [4.31, 4.32] and Texas Medicaid is partnering with the public health agency.[4.33] If Medicaid continues to be encouraged to work in partnership other agencies to better assess individual and population health and wellbeing, understanding how Medicaid can best do so and in what contexts will be invaluable to its success.

Limitations

This study is not without limitations. First, the study uses only two measures of administrative spending that are only available at the state-year level and may contain error. However, this data is used by CMS to understand and reimburse for administrative spending and thus is valuable even given data limitations. Second, these measures of administrative spending are at the full Medicaid program level and are not specific to children. As such, they are likely to be less sensitive to changes for this specific population. Third, our study does not incorporate changes in child enrollment specifically as a result of ELE. As previous studies have found, there are differences in how effective various states have been in using ELE to enroll children and our study does not provide this measure of effectiveness of these changes of administrative spending. Finally, there are many ways in which states can implement ELE and our data includes states that have done so in a variety of ways. Because there are many combinations in ELE approaches relative to the number of ELE, we may be missing important effects that are unable to be detected in the sample. We do our best to assess these variations using various modeling approaches and descriptive statistics.

Conclusions

ELE was initially touted as a mechanism which would streamline child enrollment into Medicaid and CHIP. Our findings suggest that there may be some increases in administrative spending as a result of various implementations of ELE, however states that have any form of ELE in place on average still have lower administrative spending after ELE implementation increases. In addition, previous work showing the increases in enrollment after ELE suggest the program is meeting an important and intended goal.

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CHAPTER FIVE

CONCLUSIONS

The purpose of this dissertation was to characterize trends and changes in state-level Medicaid administrative expenditures as well as consider relationships and effects of various programmatic and policy decisions. To do this, Chapter 2 first described state trends and economic, demographic, political, and programmatic correlates of two measures of Medicaid administrative spending since 2007. Chapter 3 considered the effect of Medicaid expansion after the ACA on administrative spending in addition to considering differing effects by expansion type. Finally, Chapter 4 estimated the effect of any ELE policy to facilitate child enrollment on administrative spending. In addition to consideration of any ELE policy, the current dissertation also described heterogenous effects by ELE approach and over time.

As state-run programs sensitive to economic, demographic, and political changes, the aim of Chapter 2 was to first describe the trends and levels of administrative spending by state and then to consider correlates of these spending levels. Descriptive analyses identified variation in both measures of administrative spending across states. In 2017, there was nearly a one-thousand-dollar difference in per-enrollee administrative spending between the states with the highest and lowest spending values. State fixed-effects models identified several characteristics both within and outside of state control that are related to administrative spending. Certain demographic characteristics such as birth rate, percent of the population that is 65 and older and percent of the population that is Black were associated with higher spending levels. Various programmatic characteristics including the parental eligibility policy as well as having a non-Republican governor in office were associated with significantly lower levels of administrative spending. While these estimates are not causal, this study is the first to quantify variations in Medicaid administrative spending and to estimate correlates of these outcomes. This evidence may help drive conversations about program structures, efficiency of Medicaid, and support forecasting of

state administrative spending, especially as many of the characteristics associated with administrative spending that are outside of state control are able to be forecasted.

Medicaid expansion after the ACA is one of the largest policy changes to Medicaid since its creation, however only some states expanded and many did so in different ways. On average, results presented in Chapter 3 find that there is no effect of Medicaid expansion on administrative spending compared to non-expansion states. When considering how the state expanded, there remains no effect of expansion on administrative spending for either those that expanded using the ACA mechanism or those that used demonstration waivers. However, there does appear to be a differing effect based on the potential size of expansion. Depending on the model and outcome considered, states with large expansions were observed to have significantly lower administrative spending after expansion compared to their non-expansion counterparts while states with small expansions experienced significant increases. This analysis also suggested that on average, states were able to expand without greatly affecting their administrative spending. The potential implication for Medicaid spending has been noted as a concern for governors and other policymakers and a reason for reluctance among several states that have not yet expanded Medicaid. Additionally, the finding that states with large expansions may be most likely to experience reductions in administrative spending is particularly relevant as many of the states that have not expanded their Medicaid programs would experience large expansions. This finding also supports the need to consider heterogenous effects of Medicaid policies and structures given the autonomy states have over their programs. Overall, this study will help to better inform states still considering expansions and to provide evidence regarding the efficiency and value of Medicaid spending.

The final study in this dissertation presented in Chapter 4 estimated the effects of ELE on administrative spending. Findings from this study suggest that there was no universal effect of ELE on administrative spending, however like with Medicaid expansion there may be differing effects depending on how the state structured their ELE process. States with automated ELE for

both initial and redeterminations were observed to have significant increases in administrative spending after ELE relative to non-expansion years. States with simplified ELE for initial determinations experienced a significant decrease in per-enrollee administrative spending while states with other types of ELE experienced significant increases for the percent of total spending that is administrative. Descriptive analyses of the average spending for ELE states after implementation suggest there may be a non-linear effect where there is an increase in administrative spending for several years followed by a decrease. However, on average, states with ELE even after implementation spent less on these measures of administrative spending . Like earlier work, this study suggests ELE appears to have a nonlinear effect on administrative spending and one that varies by ELE approach. Many states have modified, discontinued, or considered ELE in recent years and these findings provide a more comprehensive understanding of the potential effects of ELE and the importance of structure on these effects.

In combination, this dissertation supports greater understanding of Medicaid programs, structures, and performance. Healthcare dministrative spending has been of great interest nationally in recent years, however Medicaid has often been left out of that conversation. In addition, recent changes in Medicaid have sparked interest and concern over implications for administrative spending and alignment with the intended goals of Medicaid. The studies in this dissertation provide evidence of some of these changes, support of the need to consider state-specific context and structures, and provide a structure for future studies considering implications of additional Medicaid policies and variations.

Overall, this dissertation contributes to the knowledge base of Medicaid structures and performance. As publicly funded programs with a great deal of state control, understanding the implications of structural decisions and impact of contextual factors are vital to meeting the goals of the program. In addition, states were given authority over their programs in hope that states would serve as policy learning environments to continue to modify and improve the program. This dissertation provides an evidence base for levels, trends, and correlates of administrative

spending and then considers effects of two recent policy choices that have theoretical implications for administrative spending. In addition, my work underscores the need to thoroughly consider effects of Medicaid policies as they are often structured differently and implemented in unique state environments and therefore experience heterogeneous effects. Future work may build off of this body of evidence to explore more detailed measures of administrative spending, the effects of additional policies and structures, and consider the effectiveness or efficiency of administrative spending.

APPENDICES

APPENDIX A: Sensitivity Analysis Regression Results with Different Treatment of Outliers

Appendix Table A.1. Percent of Total Spending Administrative Model Comparisons with Different Treatment of Outliers

		MAIN MODEL		**Model 2**		**Model 3**		**Model 4**	
		top & bottom 1 percentile removed		**All State-Years**		**VT 2007-2011 removed**		**bottom 1 percentile removed**	
		coef.	**p-value**	coef.	p-value	coef.	p-value	coef.	p-value
	Recession Indicators								
	Period 1: Before Recession (2007)	**-0.00106**	**0.995**	-0.0439	0.799	-0.0454	0.793	-0.0425	0.806
	Period 2: During Recession (2008-2009)	**ref**		ref		ref		ref	
	Period 3: Post-Recession (2010-2013)	**-0.0853**	**0.564**	-0.0492	0.750	-0.0567	0.715	-0.0442	0.776
	Period 4: Post-Recession & Post-ACA Implementation (2014-2017)	**-0.366**	**0.101**	-0.207	0.374	-0.183	0.429	-0.162	0.486
PROGRAMMATIC CHARACTERISTICS	Percent Managed Care	**-0.00662***	**0.023**	-0.00847**	0.005	-0.00693*	0.024	-0.00689*	0.025
	FMAP Match Rate (%)	**-0.0189***	**0.046**	-0.0316**	0.001	-0.0272**	0.006	-0.0268**	0.007
	Parental Eligibility Policy (%FPL)	**-0.00565*****	<0.001	-0.00551***	<0.001	-0.00483***	<0.001	-0.00492***	<0.001
POLITICAL CHARACTERISTICS	Percent state budget spent on Medicaid	**0.0000507**	**0.997**	-0.00135	0.934	-0.00518	0.751	-0.00425	0.795
	Governor Democrat/Other	**-0.215***	**0.027**	-0.177	0.081	-0.239*	0.020	-0.241*	0.019
ECONOMIC & DEMOGRAPHIC CHARACTERISTICS	Unemployment Rate	**0.00791**	**0.836**	0.0579	0.146	0.0366	0.359	0.0378	0.343
	Percent population w/ Bachelor's or above	**0.0327**	**0.648**	0.0751	0.310	0.0678	0.364	0.0713	0.340
	Total population (millions)	**-0.536*****	<0.001	-0.516***	0.001	-0.520***	0.001	-0.526***	0.001
	Percent Population Male	**0.0464**	**0.866**	-0.135	0.632	-0.123	0.661	-0.132	0.639
	Birth rate (per 1,000)	**0.289****	**0.008**	0.506***	<0.001	0.438***	<0.001	0.439***	<0.001
	Percent Population 65+	**0.347*****	**0.001**	0.406***	<0.001	0.309**	0.004	0.302**	0.005
	Percent Race								
	Percent Population White	**ref**		ref		ref		ref	
	Percent Population Black	**0.268***	**0.041**	0.357**	0.010	0.360**	0.009	0.361**	0.009
	Percent Population Other	**-0.175*****	<0.001	-0.194***	<0.001	-0.188***	<0.001	-0.191***	<0.001
	Percent Population Hispanic	**0.152**	**0.096**	0.149	0.121	0.187	0.051	0.182	0.059
	Constant	**-3.417**	**0.796**	0.496	0.971	1.695	0.900	2.153	0.873

Appendix Table A.2. Per-Enrollee Administrative Spending Model Comparisons with Different Treatment of Outliers

		MAIN MODEL		**Model 2**		**Model 3**		**Model 4**	
		top & bottom 1 percentile removed		**All State-Years**		**VT 2007-2011 removed**		**bottom 1 percentile removed**	
		coef.	**p-value**	coef.	p-value	coef.	p-value	coef.	p-value
	Recession Indicators								
	Period 1: Before Recession (2007)	**0.29**	**0.99**	-1.927	0.92	-1.978	0.92	-1.94	0.92
	Period 2: During Recession (2008-2009)	**ref**		ref		ref		ref	
	Period 3:Post-Recession (2010-2013)	**-24.54**	**0.12**	-28.84	0.09	-30.44	0.07	-30.25	0.08
	Period 4: Post-Recession & Post-ACA Implementation (2014-2017)	**-85.69*** **	**<0.001**	-85.44***	<0.001	-83.45**	0.001	-83.32**	0.001
PROGRAMMATIC CHARACTERISTICS	Percent Managed Care	**-0.344**	**0.27**	-0.565	0.09	-0.379	0.26	-0.377	0.26
	FMAP Match Rate (%)	**-1.156**	**0.25**	-1.954	0.07	-1.444	0.18	-1.445	0.18
	Parental Eligibility Policy (%FPL)	**-0.463*** **	**<0.001**	-0.511***	<0.001	-0.433**	0.00	-0.433**	0.003
POLITICAL CHARACTERISTICS	Percent state budget spent on Medicaid	**0.0809**	**0.96**	0.527	0.77	0.0826	0.96	0.116	0.95
	Governor Democrat/Other	**-22.31***	**0.03**	-18.63	0.09	-25.94*	0.02	-25.84*	0.02
ECONOMIC & DEMOGRAPHIC CHARACTERISTICS	Unemployment Rate	**2.546**	**0.53**	6.346	0.15	3.93	0.37	3.935	0.37
	Percent population w/ Bachelor's or above	**11.09**	**0.15**	16.42*	0.04	15.43	0.06	15.49	0.06
	Total population (millions)	**-17.48**	**0.27**	-14.99	0.38	-15.49	0.36	-15.7	0.35
	Percent Population Male	**22.99**	**0.44**	33.75	0.27	35.55	0.25	35.52	0.25
	Birth rate (per 1,000)	**34.03****	**0.004**	49.08***	<0.001	41.00***	<0.001	41.23***	<0.001
	Percent Population 65+	**30.53****	**0.01**	33.29**	<0.001	22.14	0.06	22.02	0.06
	Percent Race								
	Percent Population White								
	Percent Population Black	**45.61****	**0.001**	61.63***	<0.001	62.13***	<0.001	62.03***	<0.001
	Percent Population Other	**-18.74*** **	**<0.001**	-20.53***	<0.001	-19.78***	<0.001	-19.92***	<0.001
	Percent Population Hispanic	**-12.25**	**0.22**	-11.91	0.26	-7.298	0.49	-7.096	0.50
	Constant	**-1713.4**	**0.22**	-2747.7	0.06	-2631.3	0.08	-2632.6	0.08

APPENDIX B: Sensitivity Analysis Regression Results with Lagged Political Characteristics

Appendix Table B.1. Sensitivity Analysis Regression Results with Lagged Political Characteristics

	Administrative Spending as Percent of Total Spending						**Per-Enrollee Administrative Spending**					
	MAIN MODEL		**Lagged Percent of State Budget**		**Lagged Governor**		**MAIN MODEL**		**Lagged Percent of State Budget**		**Lagged Governor**	
	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value
Recession Indicators												
Period 1: Before Recession (2007)	**-0.001**	**0.995**	-0.006	0.971	-0.014	0.935	**0.29**	**0.987**	-0.05	0.998	-2.33	0.897
Period 2: During Recession (2008-2009)	**ref**		ref		ref		**ref**		ref		ref	
Period 3: Post-Recession (2010-2013)	**-0.085**	**0.564**	-0.090	0.544	-0.061	0.682	**-24.54**	**0.122**	-24.89	0.117	-22.23	0.161
Period 4: Post-Recession & Post-ACA Implementation (2014-2017)	**-0.366**	**0.101**	-0.368	0.098	-0.352	0.116	**-85.69*** **	**<0.001**	-85.85***	<0.001	-84.65***	<0.001
Percent Managed Care	**-0.007***	**0.023**	-0.007*	0.021	-0.007*	0.025	**-0.34**	**0.273**	-0.35	0.264	-0.34	0.28
FMAP Match Rate (%)	**-0.019***	**0.046**	-0.019*	0.043	-0.018	0.06	**-1.16**	**0.254**	-1.18	0.246	-1.04	0.306
Parental Eligibility Policy (%FPL)	**-0.006*** **	**<0.001**	-0.006***	<0.001	-0.006***	<0.001	**-0.46*** **	**0.001**	-0.47***	<0.001	-0.45**	0.001
Percent state budget spent on Medicaid	**0.000**	**0.997**			0.001	0.968	**0.08**	**0.961**			0.03	0.984
Lagged % state budget spent on Medicaid			0.009	0.583					0.68	0.684		
Governor Democrat/Other	**-0.215***	**0.027**	-0.214*	0.028			**-22.31***	**0.034**	-22.26*	0.034		
Lagged governor Democrat/Other					-0.088	0.359					-15.69	0.13
Unemployment Rate	**0.008**	**0.836**	0.011	0.772	0.002	0.957	**2.55**	**0.532**	2.80	0.497	1.919	0.638
Percent population w/ Bachelor's or above	**0.033**	**0.648**	0.035	0.623	0.044	0.545	**11.09**	**0.151**	11.28	0.145	11.51	0.138
Total population (millions)	**-0.536*** **	**<0.001**	-0.550***	<0.001	-0.571***	<0.001	**-17.48**	**0.265**	-18.53	0.239	-19.34	0.218
Percent Population Male	**0.046**	**0.866**	0.051	0.853	0.046	0.869	**22.99**	**0.435**	23.26	0.429	24.35	0.41
Birth rate (per 1,000)	**0.289****	**0.008**	0.294**	0.007	0.286**	0.009	**34.03****	**0.004**	34.40**	0.003	33.59**	0.004
Percent Population 65+	**0.347*** **	**0.001**	0.336**	0.001	0.341**	0.001	**30.53****	**0.006**	29.75**	0.008	30.19**	0.007
Percent Race												
Percent Population White												
Percent Population Black	**0.268***	**0.041**	0.261*	0.047	0.262*	0.047	**45.61****	**0.001**	45.05**	0.002	45.66**	0.002
Percent Population Other	**-0.175*** **	**<0.001**	-0.175***	<0.001	-0.182***	<0.001	**-18.74*** **	**<0.001**	-18.74***	<0.001	-19.02***	<0.001
Percent Population Hispanic	**0.152**	**0.096**	0.153	0.094	0.156	0.09	**-12.25**	**0.215**	-12.16	0.219	-12.19	0.219
Constant	**-3.417**	**0.796**	-3.632	0.784	-3.355	0.801	**-1713.4**	**0.224**	-1726.6	0.221	-1775.9	0.21

APPENDIX C: Expansion Status, Type, & Dates

Appendix Table C.1. Expansion Status, Type, & Dates

NON-EXPANSION	EXPANSION		
State	**State**	**Implementation Date**	**Traditional/Waiver Expansion**
Alabama	Alaska	September 2015	traditional
Florida	Arizona	January 2014	traditional
Georgia	Arkansas	January 2014	waiver
Idaho	California	January 2014	traditional
Kansas	Colorado	January 2014	traditional
Maine	Connecticut	January 2014	traditional
Mississippi	Delaware	January 2014	traditional
Missouri	Hawaii	January 2014	traditional
Nebraska	Illinois	January 2014	traditional
North Carolina	Indiana	February 2015	waiver
Oklahoma	Iowa	January 2014	waiver
South Carolina	Kentucky	January 2014	traditional
South Dakota	Louisiana	July 2016	traditional
Tennessee	Maryland	January 2014	traditional
Texas	Massachusetts	January 2014	traditional
Utah	Michigan	April 2014	waiver
Virginia	Minnesota	January 2014	traditional
Wisconsin	Montana	January 2016	waiver
Wyoming	Nevada	January 2014	traditional
	New Hampshire	August 2014	waiver
	New Jersey	January 2014	traditional
	New Mexico	January 2014	traditional
	New York	January 2014	traditional
	North Dakota	January 2014	traditional
	Ohio	January 2014	traditional
	Oregon	January 2014	traditional
	Pennsylvania	January 2015	traditional
	Rhode Island	January 2014	traditional
	Vermont	January 2014	traditional
	Washington	January 2014	traditional
	West Virginia	January 2014	traditional

APPENDIX D: Parallel Trends Assumption Testing

The difference-in-differences (DID) approach requires there to be parallel trends between the treatment and control observations in the pre-intervention period. Because the intervention (expansion) is timed differently across the treatment observations, we assess this in several ways. First, we consider parallel trends graphically for all expansion states compared to non-expansion states by looking for parallel trends before the main expansions in 2014. Second, we test the parallel trends assumption statistically by running a linear regression with each measure of administrative spending as a function of interaction terms for each year and a binary indicator for that year ever being an expansion state during the study period. We then use a joint-F test to assess the significance of all of the pre-expansion years relative to 2013, the last full year prior to expansion.

Appendix Table D.1. Parallel Trends Assessment for Per-Enrollee Administrative Expenditures Model

	COEF.	STD. ERR.	T	P>T	[95% CONF.	INTERVAL]
EXPANSION*2007	53.53679	35.55994	1.51	0.133	-16.31953	123.3931
EXPANSION*2008	65.80458	35.55994	1.85	0.065	-4.051746	135.6609
EXPANSION*2009	35.24792	35.55994	0.99	0.322	-34.6084	105.1042
EXPANSION*2010	0.7889407	35.02717	0.02	0.982	-68.02079	69.59867
EXPANSION*2011	-2.169947	35.02717	-0.06	0.951	-70.97968	66.63978
EXPANSION*2012	37.55677	34.52134	1.09	0.277	-30.25926	105.3728
EXPANSION*2014	-44.19536	35.02717	-1.26	0.208	-113.0051	24.61437
EXPANSION*2015	-8.617339	34.52134	-0.25	0.803	-76.43338	59.1987
EXPANSION*2016	-16.14264	35.55994	-0.45	0.65	-85.99896	53.71369
EXPANSION*2017	-10.36676	34.52134	-0.3	0.764	-78.1828	57.44927
CONSTANT	442.2284	11.67572	37.88	0	419.2918	465.1649

F(6, 528) = 1.09

PROB > F = 0.3688

Appendix Table D.2. Parallel Trends Assessment for Percent of Total Spending that is Administrative Model

	COEF.	STD. ERR.	T	P>T	[95% CONF.	INTERVAL]
EXPANSION*2007	-0.107754	0.2895403	-0.37	0.71	-0.676547	0.4610381
EXPANSION*2008	-0.096999	0.2939402	-0.33	0.742	-0.674434	0.4804372
EXPANSION*2009	-0.237695	0.2895403	-0.82	0.412	-0.806487	0.3310979
EXPANSION*2010	-0.563564	0.2939402	-1.92	0.056	-1.141	0.0138714
EXPANSION*2011	-0.541829	0.2895403	-1.87	0.062	-1.110622	0.0269632
EXPANSION*2012	-0.011746	0.2853629	-0.04	0.967	-0.572332	0.54884
EXPANSION*2014	-0.067188	0.2895403	-0.23	0.817	-0.635980	0.5016047
EXPANSION*2015	-0.187669	0.2853629	-0.66	0.511	-0.748255	0.3729176
EXPANSION*2016	-0.273520	0.2895403	-0.94	0.345	-0.842312	0.2952727
EXPANSION*2017	-0.238421	0.2853629	-0.84	0.404	-0.799007	0.3221653
CONSTANT	5.172057	0.0968729	53.39	0	4.981753	5.36236

F(6, 528) = 1.14

PROB > F = 0.3395

APPENDIX E: Description of Size of Expansion

Expansion size was proxied using the percent of the non-elderly, adult population below 100% FPL that was uninsured in the last full year prior to expansion obtained from KFF. This measure was chosen because this full population should have become eligible for Medicaid after expansion and represents the size of the potential expansion. Below are the uninsurance rates for that state population in the year before expansion as well as if the state was classified as a large or small expansion state. The average and median uninsurance rates for expansion states in the year before expansion were used as the cutoffs for being a large or small expansion state. The average uninsurance rate for these state-years was 32.3% while the median uninsurance rate was 33.2%. These yielded the same classification for all states except for North Dakota which is considered a large expansion state when using the average cutoff but a small expansion states when using the median cutoff.[a]

Appendix Table E.1. Expansion State, Timing, and Size

State	Last full year before expansion	Uninsurance rate (%)	Expansion Size
Alaska	2014	42.99	large
Arizona	2013	42.04	large
Arkansas	2013	47.10	large
California	2013	39.96	large
Colorado	2013	34.03	large
Connecticut	2013	26.18	small
Delaware	2013	24.61	small
Hawaii	2013	22.06	small
Illinois	2013	37.00	large
Indiana	2014	35.58	large
Iowa	2013	27.53	small
Kentucky	2013	41.83	large
Louisiana	2015	35.89	large
Maryland	2013	27.50	small
Massachusetts	2013	10.03	small
Michigan	2013	30.66	small
Minnesota	2013	21.30	small
Montana	2015	31.98	small
Nevada	2013	54.18	large
New Hampshire	2013	34.88	large
New Jersey	2013	42.84	large
New Mexico	2013	47.75	large
New York	2013	23.63	small
North Dakota	2013	32.42	large/small [a]
Ohio	2013	30.44	small
Oregon	2013	35.90	large
Pennsylvania	2014	25.69	small
Rhode Island	2013	31.80	small
Vermont	2013	9.23	small
Washington	2013	40.49	large
West Virginia	2013	34.03	large

APPENDIX F: Effects of Expansion Full Regression Results with Controls Presented

Appendix Table F.1. Full Regression Results for Per-Enrollee Administrative Spending Models

	PRESENTED ANALYSES				
	All exp vs non	**Waiver exp vs non**	**Traditional exp vs non**	**lg exp vs non (med)**	**sm exp vs non (med)**
Expansion	-12.37	-19.09	-10.99	-77.08*	50.56
Percent Managed Care	-0.192	0.122	-0.390	0.211	-0.489
FMAP Match Rate	2.468	3.416	1.129	6.550	-0.900
Parental Eligibility (%FPL)	-0.430	0.0476	-0.532	0.0250	-0.450
Percent State Budget on Medicaid	0.121	-1.698	-0.302	0.984	-3.009
Governor's Political Affiliation					
Republican	ref	ref	ref	ref	ref
Democrat/Other	-18.88	-19.98	-18.63	-27.82	-25.78
Unemployment Rate	7.030	15.02	9.974	9.596	10.40
Percent Population with Bachelor's or Above	1.636	0.981	1.154	-8.328	6.009
Total Population (millions)	-25.06	10.29	-17.99	-5.417	-8.847
Percent Population Male	-1.158	-57.54	-0.379	-24.05	-11.89
Birth Rate (per 1,000)	41.43**	53.33**	44.42**	44.08*	37.40*
Percent Population 65+	-3.088	-9.143	12.94	-20.93	37.99
Population Race					
Percent White	ref	ref	ref	ref	ref
Percent Black	35.86	-40.22	41.36	-12.20	15.67
Percent Other	-21.14**	-18.49	-20.89*	-18.81*	-25.60
Percent Population Hispanic	-23.67	-48.10*	-23.79	-53.63**	-18.81
Constant	88.73	3265.7	-168.5	1988.1	314.1
N	539	275	473	380	368
adj. R-sq	0.238	0.192	0.255	0.343	0.181

* p<0.05 ** p<0.01 *** p<0.001

Appendix Table F.2. Full Regression Results for Percent of Total Spending that is Administrative Models

	PRESENTED ANALYSES				
	All exp vs non	**Waiver exp vs non**	**Traditional exp vs non**	**lg exp vs non (med)**	**sm exp vs non (med)**
Expansion	0.115	0.0877	0.0953	-0.411	0.663**
Percent Managed Care	-0.00530	-0.00272	-0.00562	-0.00155	-0.00790
FMAP Match Rate	-0.00284	0.00631	-0.000014	0.0450	-0.0219
Parental Eligibility (%FPL)	-0.006**	-0.00041	-0.007***	-0.00106	-0.00764**
Percent State Budget on Medicaid	0.000845	-0.0451	0.00861	-0.000056	-0.0239
Governor's Political Affiliation					
Republican	ref	ref	ref	ref	ref
Democrat/Other	-0.201	-0.223	-0.176	-0.305	-0.223
Unemployment Rate	-0.0110	0.0190	-0.0140	0.0340	-0.0885
Percent Population with Bachelor's or Above	0.0380	-0.0173	0.0379	-0.0269	0.0602
Total Population (millions)	-0.567*	0.0676	-0.565*	-0.393	-0.244
Percent Population Male	-0.0352	-0.346	-0.0102	-0.225	0.0725
Birth Rate (per 1,000)	0.294*	0.357*	0.307*	0.293	0.225
Percent Population 65+	0.212	0.150	0.255	0.0154	0.456
Population Race					
Percent White	ref	ref	ref	ref	ref
Percent Black	0.203	-0.519	0.250	-0.245	0.0486
Percent Other	-0.179*	-0.112	-0.184*	-0.160	-0.194
Percent Population Hispanic	0.101	-0.254	0.125	-0.195	0.150
Constant	2.556	24.53	-0.162	18.95	-4.145
N	539	273	473	381	365
adj. R-sq	0.208	0.211	0.213	0.241	0.216

* p<0.05 ** p<0.01 *** p<0.001

APPENDIX G: Regression Results from Expansion Sensitivity Analyses

Appendix Table G.1. Regression Results for Per-Enrollee Administrative Spending Sensitivity Analyses

	SENSITIVITY ANALYSES				
	Post-recession only (2010-2017)	**All exp vs non, lead effect**	**All exp vs non, lag effect**	**Stratified lg exp vs non (avg)**	**Stratified sm exp vs non (avg)**
Expansion	-5.491			-66.95	58.61*
Expansion Lead		18.32			
Expansion Lag			12.63		
Percent Managed Care	-0.412	-0.0988	-0.196	0.158	-0.461
FMAP Match Rate	3.276	3.276	2.760	5.309	0.574
Parental Eligibility (%FPL)	-0.432	-0.434	-0.505*	-0.0532	-0.489
Percent State Budget on Medicaid	-1.926	0.0986	-0.404	1.613	-3.890
Governor's Political Affiliation					
Republican	ref	ref	ref	ref	ref
Democrat/Other	-21.25	-11.45	-19.63	-24.81	-28.20
Unemployment Rate	12.82	6.294	8.242	11.23	10.55
Percent Population with Bachelor's or Above	18.07	-8.955	1.075	-2.390	5.381
Total Population (millions)	-23.23	-39.24	-20.85	-8.577	-10.76
Percent Population Male	2.833	-14.40	-0.232	-10.62	-34.15
Birth Rate (per 1,000)	44.62*	37.48*	40.69**	48.28**	24.73
Percent Population 65+	24.52	-5.078	-5.943	-31.84	56.91
Population Race					
Percent White	ref	ref	ref	ref	ref
Percent Black	68.71	13.52	32.68	16.38	-3.871
Percent Other	-16.28	-25.84**	-21.51**	-18.00*	-26.99
Percent Population Hispanic	-6.184	-22.72	-26.86*	-51.23**	-10.40
Constant	-1648.8	1411.9	141.6	985.6	1478.1
N	395	489	539	390	358
adj. R-sq	0.197	0.244	0.238	0.326	0.212

* p<0.05 ** p<0.01 *** p<0.001

Appendix Table G.2. Regression Results for Percent of Total Spending that is Administrative Sensitivity Analyses

	SENSITIVITY ANALYSES				
	Post-recession only (2010-2017)	**All exp vs non, lead effect**	**All exp vs non, lag effect**	**Stratified lg exp vs non (avg)**	**Stratified sm exp vs non (avg)**
Expansion	0.209			-0.329	0.685**
Expansion Lead		0.220			
Expansion Lag			0.127		
Percent Managed Care	-0.00653	-0.00388	-0.00526	-0.00170	-0.00825
FMAP Match Rate	-0.00301	-0.000079	-0.00227	0.0327	-0.00842
Parental Eligibility (%FPL)	-0.00521*	-0.00472*	-0.0058**	-0.00137	-0.008***
Percent State Budget on Medicaid	-0.0282	0.00283	0.000216	0.00157	-0.0254
Governor's Political Affiliation					
Republican	ref	ref	ref	ref	ref
Democrat/Other	-0.180	-0.125	-0.191	-0.293	-0.226
Unemployment Rate	-0.00206	-0.0240	-0.00978	0.0443	-0.0943
Percent Population with Bachelor's or Above	0.129	-0.0159	0.0377	-0.0132	0.0776
Total Population (millions)	-0.463	-0.711*	-0.567*	-0.406	-0.254
Percent Population Male	0.0832	-0.0610	-0.0250	-0.253	0.176
Birth Rate (per 1,000)	0.389*	0.208	0.294*	0.342*	0.129
Percent Population 65+	0.358	0.200	0.214	-0.0539	0.558
Population Race					
Percent White	ref	ref	ref	ref	ref
Percent Black	0.248	0.109	0.199	-0.0764	-0.0751
Percent Other	-0.164**	-0.188*	-0.179*	-0.153	-0.207*
Percent Population Hispanic	0.220	0.109	0.0999	-0.194	0.208
Constant	-11.13	8.144	2.032	18.93	-9.107
N	393	489	539	390	356
adj. R-sq	0.233	0.205	0.209	0.237	0.227

* p<0.05 ** p<0.01 *** p<0.001

APPENDIX H: Description of ELE Data

ELE policy data came from a variety of sources including 1. CMS data table of ELE data most recently accessed on March 25, 2020; 2. Medicaid State Plan Amendments; 3. KFF annual reports from the Survey of Medicaid Officials; 4. report from the mandatory first year evaluation conducted by Mathematica, and 5. report from the mandatory final evaluation conducted by Mathematica. There were several differences across these data sources. The data sources given the highest priority were the two mandatory evaluation reports from Mathematica. These evaluations required thorough and timely evaluations of the status and progress of states towards ELE implementation, however they are only available for certain states and in the early years of the program. These provided the most detail on actual implementation dates and changes in the early years of ELE. KFF reports had more limited data but are available for all states on a yearly basis. In order to implement ELE, states use State Plan Amendment modifications. These provide detail on the ELE approach and implementation dates, however there are a few instances of missing documents. Finally, the CMS data table provides more limited information and includes inconsistencies and missing fields. Because of the variation in implementation data, several sensitivity analyses were conducted to assess the robustness of the findings to the variations in data. See results from these analyses in Appendix J.

APPENDIX I: Effects of ELE Full Regression Results with Controls Presented

Appendix Table I.1. Effects of ELE Full Regression Results with Controls Presented

	PER ENROLLEE ADMIN SPENDING MODELS				PERCENT OF TOTAL SPENDING ADMIN MODELS			
	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	Any ELE		ELE approach		Any ELE		ELE approach	
	coef	p-value	coef	p-value	coef	p-value	coef	p-value
ELE active								
No ELE	ref	ref			ref	ref		
Any ELE	-10.80	0.575			0.36	0.060		
ELE Approach								
No/pre-ELE								
Simplified, initial			-45.54	0.007			-0.03	0.841
Auto, both			66.17	0.001			1.32	<0.001
Other ELE			14.84	0.509			0.54	0.004
Percent Managed Care	-0.18	0.701	-0.15	0.760	-0.01	0.177	-0.01	0.210
Medicaid Expansion Status								
Non-Expansion	ref	ref	ref	ref	ref	ref	ref	ref
Expansion	-11.08	0.681	-8.20	0.761	0.12	0.556	0.16	0.418
FMAP Match Rate	2.57	0.464	3.69	0.294	0.00	0.974	0.01	0.631
Parental Eligibility Policy (%FPL)	-0.45	0.065	-0.43	0.080	-0.01	0.003	-0.01	0.005
Percent of State Budget on Medicaid	0.14	0.954	-0.22	0.929	0.00	0.878	-0.01	0.741
Governor's Political Affiliation								
Republican	ref	ref	ref	ref	ref	ref	ref	ref
Democrat/Other	-20.14	0.115	-20.68	0.095	-0.20	0.135	-0.22	0.096
Unemployment rate	7.70	0.400	8.17	0.381	0.00	0.990	0.01	0.917
Percent Bachelor's Degree or Above	1.88	0.861	3.38	0.741	0.02	0.827	0.04	0.675
Total Population (millions)	-26.66	0.221	-27.78	0.214	-0.55	0.040	-0.56	0.042
Percent of Population Male	-0.79	0.976	-8.07	0.756	-0.03	0.901	-0.10	0.689
Birth Rate (per 1,000)	42.45	0.002	43.68	0.001	0.32	0.004	0.34	0.002
Percent of Population 65+	-4.60	0.869	-8.36	0.760	0.20	0.378	0.16	0.477
Population Race								
Percent of Population White	ref	ref	ref	ref	ref	ref	ref	ref
Percent of Population Black	35.87	0.164	38.61	0.120	0.20	0.295	0.24	0.137
Percent of Population Other Race	-21.29	0.008	-22.00	0.006	-0.18	0.015	-0.18	0.010
Percent of Population Hispanic	-21.38	0.088	-20.15	0.095	0.10	0.435	0.11	0.369

APPENDIX J: Regression Results from ELE Sensitivity Analyses

Several sensitivity analyses were conducted based on variations in ELE policy data across sources and to exclude post-Medicaid expansion years from the data. Findings from sensitivity analyses are all qualitatively similar to the main findings presented in terms of direction and significance of coefficient estimates.

- Sensitivity analysis 1 includes New Jersey having active ELE in 2017. In the main model, New Jersey 2017 was excluded from the analysis because these years were not considered active ELE in the KFF 2017 report however there was no other evidence that New Jersey terminated their ELE program during the study period.
- Sensitivity analysis 2 includes Maryland having active ELE in 2016 and 2017. In the main model, Maryland 2016 and 2017 were excluded from the analysis because these years were not considered active ELE in the KFF 2017 report however there was no other evidence that Maryland terminated their program during the study period.
- Sensitivity analysis 3 excludes South Carolina's use of ELE for initial determinations throughout the study period. In the main model, South Carolina is considered to have ELE for initial determinations starting in 2013. KFF reports and the final year findings from the Mathematica evaluation report suggest that South Carolina had ELE for initial determinations starting in September of 2012 however neither the CMS table nor South Carolina State Plan Amendments reflect this.
- Sensitivity analysis 4 considers only the years prior to main Medicaid expansions of 2014. While expansion indicators are included in the main models presented, this analysis supplements these to ensure that any findings of the effects of ELE are not being driven indirectly through Medicaid expansion decisions and implementation.

Appendix Table J.1. Results from Sensitivity Analyses for Per-Enrollee Models

	Per-Enrollee Admin Models					
	Sensitivity Analysis 1- NJ 2017 on		Sensitivity Analysis 2- MD 2016 & 2017 on		Sensitivity Analysis 3- SC Initial Det off entire time	Sensitivity Analysis 4- Pre-Expansion only (2013 and earlier)	
	any ELE	ELE approach	any ELE	ELE approach	ELE approach	any ELE	ELE approach
ELE active							
No ELE	ref		ref			ref	
Any ELE	-11.62		-11.21			-8.08	
ELE Approach							
No/pre-ELE		ref		ref	ref		ref
Simplified, initial		-47.57**		-57.50**	-44.79**		-60.06*
Auto, both		66.01**		66.21**	69.68*		69.60**
Other ELE		15.28		13.76	22.38		44.19*

Appendix Table J.2. Results from Sensitivity Analyses for Percent of Total Spending that is Administrative Models

	Percent of Total Spending that is Administrative Models					
	Sensitivity Analysis 1- NJ 2017 on		Sensitivity Analysis 2- MD 2016 & 2017 on		Sensitivity Analysis 3- SC Initial Det off entire time	Sensitivity Analysis 4- Pre-Expansion only (2013 and earlier)	
	any ELE	ELE approach	any ELE	ELE approach	ELE approach	any ELE	ELE approach
ELE active							
No ELE	ref		ref			ref	
Any ELE	0.35		0.35			0.20	
ELE Approach							
No/pre-ELE		ref		ref	ref		ref
Simplified, initial		-0.04		-0.12	-0.02		-0.26
Auto, both		1.32***		1.32***	1.09***		1.17***
Other ELE		0.54**		0.53**	0.70**		0.57**

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PhD, Health Policy and Management 2016 - 2020
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State Epidemiological Outcomes Workgroup	2016 – 2018
Medicaid expansion systematic review	2017
Public health systems & services workforce	2018 – 2019
Optimizing Patient Transfers, Impacting Medical Quality, & Improving Symptoms: Transforming Institutional Care	2019 – 2020
Emergency department utilization related to opioid use	2017 – 2020
Perceptions of progress and barriers towards the 2008 Institute of Medicine Report, '*For the Public's Health: Investing in a Healthier Future*'	2019 - 2020

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High School Science Teacher	2014 - 2016
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PEER-REVIEWED PUBLICATIONS

1. Orr JM, Leider JP, Singh S, **Balio CP**, Yeager VA, Bekemeier B, McCullough MJ, Resnick B. Regarding Investment in a Healthier Future: Impact of the 2012 Institute of Medicine Finance Report. Accepted for publication at Journal of Public Health Management and Practice.

2. **Balio CP**, Wiley Jr KK, Greene MS, Vest JR. Opioid-Related Emergency Department Encounters: Patient, Encounter, and Community Characteristics Associated With Repeated Encounters. Annals of Emergency Medicine. 2020 Jan 23.

3. **Balio CP**, Apathy NC, Danek RL. Health Information Technology and Accountable Care Organizations: A Systematic Review and Future Directions. eGEMs. 2019;7(1).

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2. Greene MS, **Balio C,** Kooreman HE, Jacinto C, Hilts K. (2018). Indiana State Epidemiology and Outcomes Workgroup. The consumption and consequences of alcohol, tobacco, and drugs in Indiana: A state epidemiological profile 2018. Indiana University Center for Health Policy. Indianapolis, IN. [Annual publication]

3. **Balio C**, Greene MS. (2018). *The impact of parental incarceration on children's health & development* (No. 18-H08). IUPUI Center for Health Policy. Retrieved from https://fsph.iupui.edu/doc/research-centers/Parental-Incarceration.pdf

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1. **Balio CP**, Blackburn J, Menachemi N. Trends in and Correlates of State Medicaid Administrative Expenditures (2007-2017). Poster presentation at 2020 AcademyHealth Health Datapalooza and National Health Policy Conference, Feb 10, 2020. AcademyHealth.

2. **Balio CP** & Yeager V. (2019, November). Public Health 3.0: Perceptions from the Workplace. Presentation at APHA's 2019 Annual Meeting and Expo (Nov. 2-Nov. 6). American Public Health Association.

3. Yeager V, Beitsch L, Kronstadt J, **Balio CP**. (2019, November). Accreditation and Workforce Satisfaction, Retention, and Training Needs in Public Health Agencies. Presentation at APHA's 2019 Annual Meeting and Expo (Nov. 2-Nov. 6). American Public Health Association.

4. **Balio CP**, Wiley KK, Greene MS, Vest JR. Opioid-Related Emergency Department Encounters: Patient and Visit Characteristics Associated with Repeat Encounters. Poster presentation at AcademyHealth Annual Research Meeting, Washington DC, June 2-4, 2019.

5. **Balio CP**. The relationship between adverse childhood experiences, substance misuse, suicide, & future health. Presentation at Faces of Suicide Conference, Gary, IN, Nov. 2, 2018.

6. **Balio CP**, Apathy NC, Wiley, KK. Patient-Centered Medical Home Patients Have Fewer Hospitalizations: An Analysis Using MEPS Data. Poster presentation at AcademyHealth Annual Research Meeting, Seattle, WA, June 24-26, 2018.

7. **Balio CP**. The relationship between adverse childhood experiences, substance misuse, and future health. Podium presentation at Indiana State Epidemiological Outcomes Workgroup Annual Symposium, Indianapolis, IN, May 18, 2018.

8. **Balio CP** & Wiley, KK. Does incorporating unstructured data provide more accurate prevalence estimates of opioid misuse than structured data alone? Podium presentation at

Indiana State Epidemiological Outcomes Workgroup Annual Symposium, Indianapolis, IN, May 18, 2018.

9. Apathy NC, **Balio CP**, Danek RL. Underrepresentation of health information technology studies in the context of accountable care organizations: Using the HSRProj database. Poster presentation at AcademyHealth Annual Research Meeting, New Orleans, LA, June 25-27, 2017.

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1. Menachemi N, **Balio CP**. (Forthcoming) Understanding Revenue and Delivery Models in the United States Healthcare System, in Boulton, ML, and Wallace, RB, Maxcy-Rosenau-Last Public Health and Preventive Medicine, 16th ed. New York, NY: McGraw-Hill.

TEACHING EXPERIENCE

Instructor, H346: Organizational Behavior & Human Resources for Healthcare — Fall, 2019
Undergraduate course, hybrid
Enrollment: 42

Teaching Assistant, H101: Influencing the Public's Health — Fall 2018, Spring 2019
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Teaching Assistant, H501: US Health Care System and Health Policy
Summer 2018
Master of Public Health course, online
Enrollment: 36

Teaching Assistant, Leadership in Healthcare Administration — Fall 2017
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Enrollment: 29

AWARDS AND HONORS

HSRProj Student Competition Winner (with team) — 2017
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Teacher of Excellence Award — 2016
MeckEd award for Charlotte-Mecklenberg Schools elementary, middle, and high school educators

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Member, Academy of Management, 2017 - current